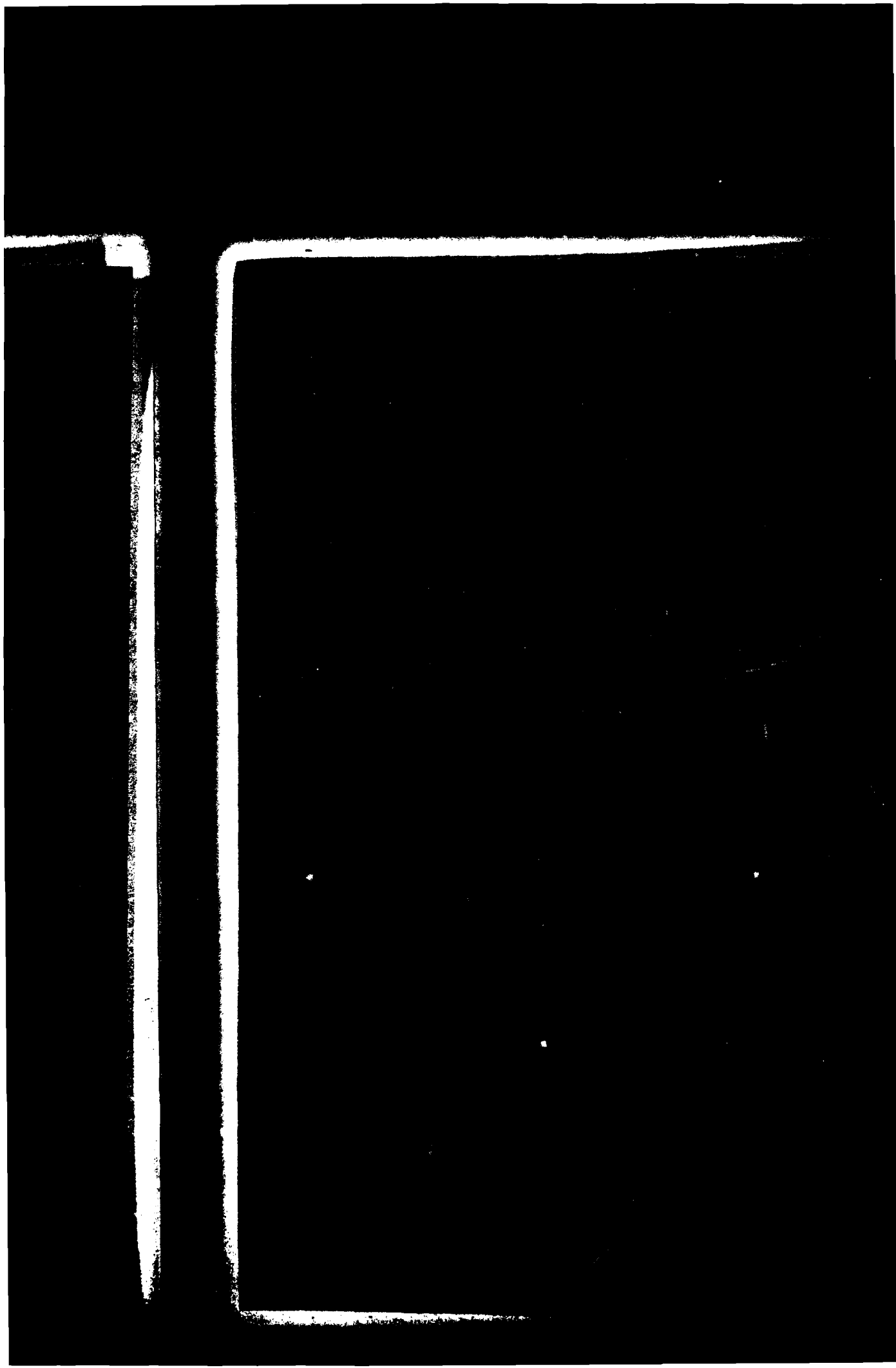MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

REPORT DOCUMENTATION PAGE	READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
NAVTRAEQUIPC 77-C-0162-5	AD-A091 846	

4. TITLE *(and Subtitle)*	5. TYPE OF REPORT & PERIOD COVERED
Ground Controlled Approach Controller Training System Instructor Guide	Final Report. 23 SEP 1977 — 23 FEB 1980
	6. PERFORMING ORG. REPORT NUMBER

7. AUTHOR(s)	8. CONTRACT OR GRANT NUMBER(s)
Mary/Hicklin	N61339-77-C-0162

9. PERFORMING ORGANIZATION NAME AND ADDRESS	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
Logicon, Inc., Tactical & Training Systems Div. P.O. Box 80158 San Diego, CA 92138	7796-1P1

11. CONTROLLING OFFICE NAME AND ADDRESS	12. REPORT DATE
Naval Training Equipment Center Orlando, Florida, 32813	June 1980
	13. NUMBER OF PAGES
	129

14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)	15. SECURITY CLASS. (of this report)
	UNCLASSIFIED
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT *(of this Report)*

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT *(of the abstract entered in Block 20, if different from Report)*

18. SUPPLEMENTARY NOTES

19. KEY WORDS *(Continue on reverse side if necessary and identify by block number)*

Adaptive Training
Ground Controlled Approach
Performance Evaluation

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

This manual provides detailed information about the use of the Ground Controlled Approach Controller Training System (GCA-CTS) including:
- Use of the GCA-CTS in training,
- Daily operational readiness testing
- GCA-CTS startup and shutdown procedures,

DD FORM 1473 EDITION OF 1 NOV 65 IS OBSOLETE

411171
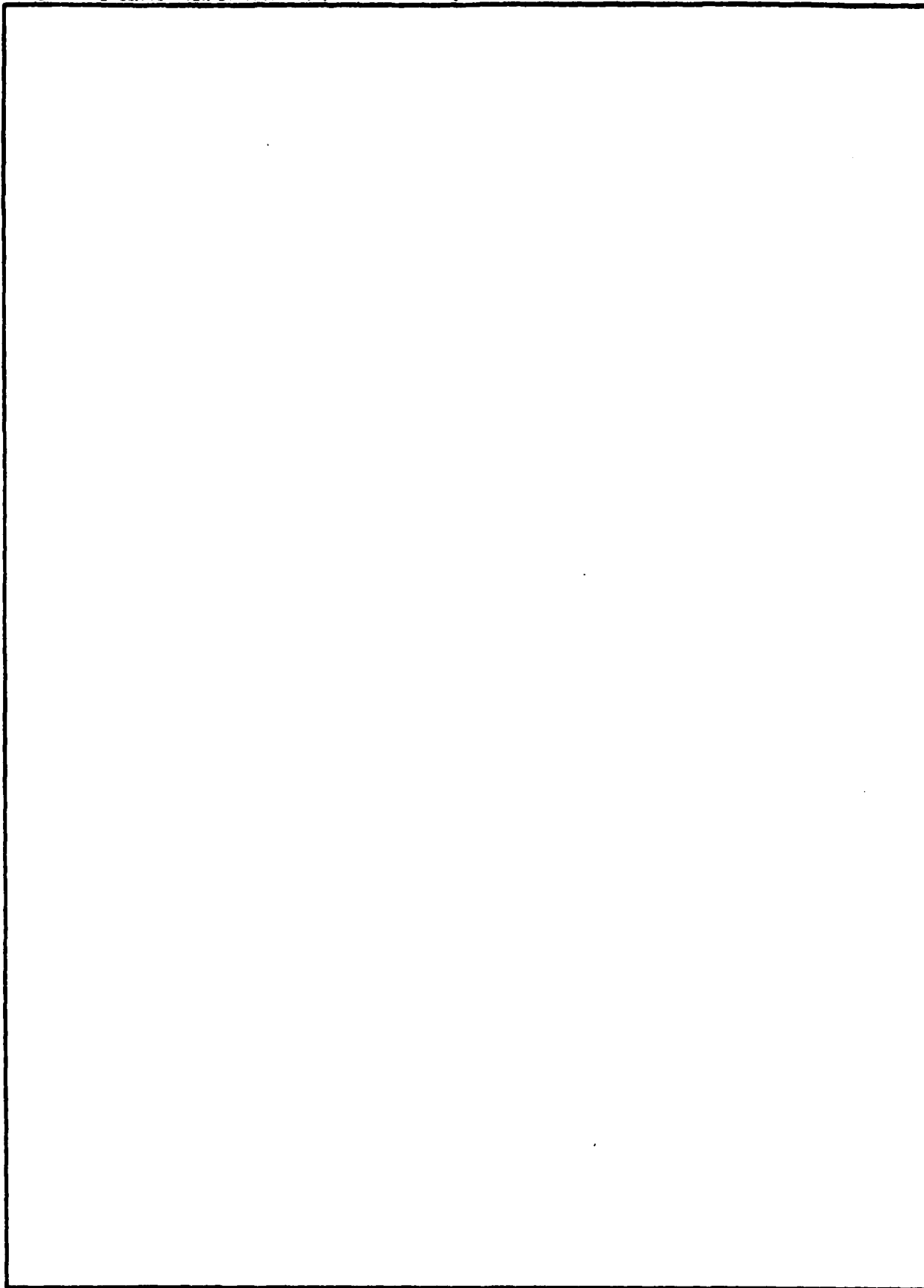
TABLE OF CONTENTS

TABLE OF CONTENTS — Continued

LIST OF ILLUSTRATIONS

LIST OF TABLES

SECTION I

INTRODUCTION

WHAT IS A GCA-CTS?

The Ground Controlled Approach Controller Training System (GCA-CTS) is an automated adaptive training aid designed to convey the basic concepts of GCA control and to provide a simulated environment in which a trainee can practice GCA control skills under the supervision of an automated performance measurement feature. It has been designed to take over many of the routine aspects of training and thus to give the instructor more time to devote to his or her responsibilities as a learning supervisor.

The GCA-CTS is an experimental prototype device, built under the direction of the Naval Training Equipment Center (NAVTRAEQUIPCEN). It incorporates technologies which have never before been used in the training environment. The questions the researchers will be asking include: Is it feasible to employ automated speech recognition with naive users in a training environment? Is it possible to automate the training of a primarily verbal task like GCA control? In helping to answer these questions, you will have an influence not only on the form GCA training takes in future years, but more importantly, your evaluation will have an impact on a much wider area of Naval training system development. You cooperation in this project is greatly appreciated.

ROLE OF GCA-CTS IN TRAINING

The GCA-CTS is more than a simulator, it is a training system. It is designed to free you from routine tasks such as conveying basic information, correcting simple errors, maintaining records, serving as the tower controller, and so on. The intent is to give you more time to devote to conveying the more subtle aspects of the job to the student and to making a careful evaluation of each student's potential for competent performance in this demanding profession.

FOCUS OF THIS DOCUMENT

This guide is intended to familiarize you with the features of the GCA-CTS and to give you the information you need to use the system. The guide is arranged to give you quick access to the information about any particular GCA-CTS feature. Please note, however, that with the exception of the simple startup procedures, the GCA-CTS itself will provide clearly stated requests for any information it may need to process one of your special requests. Thus there will be no need for you to learn complicated procedures for controlling the system. You will find the GCA-CTS is a system which will work for you, giving you the time and information you need to perform your duties as a learning supervisor.

In the following section, the GCA-CTS hardware is described, then the instructional features of GCA-CTS are discussed in Section III. Section IV gives an account of some important system capabilities. Section V consists of explanations of the special functions available through the learning supervisor and trainee station keyboards. A set of appendices provides supplementary information. Appendix A gives an explanation of the GCA-CTS scoring scheme. Appendix B is provided to cross-reference the errors reported on the P-Run report with the training materials. Appendix C provides guidelines for good speech recognition. Appendix D explains the use of the offline program which prints student files. Appendix E shows an overview of how to use the GCA-CTS. Appendix F gives system startup procedures, daily operational readiness testing procedures, shutdown and recovery procedures.

SECTION II

THE GCA-CTS HARDWARE

COMPONENTS

The GCA-CTS includes a trainee station, a learning supervisor station, and a system controller, as shown in Figure 1.

THE TRAINEE STATION

The main components of the trainee station, shown in Figure 2, are a graphics display unit used for the radar simulation, a CRT used for conveying textual information to the student, a keyboard through which the trainee may make requests, and a communications panel.

THE LEARNING SUPERVISOR STATION

The learning supervisor station is shown in Figure 3. The main components include a CRT and keyboard, a communications panel, and a small printer. The system displays status information on the CRT and responds to requests entered at the keyboard. Hardcopy reports are provided at your request on the printer.

The communications panel shown in Figure 4 enables you to listen to the trainee whenever the AUDIO MONITOR button is depressed. You may request that the audio output be directed to the speaker or to your headset by selecting the appropriate buttons on this panel. The ICS button enables you to talk to the trainee. When you depress it, it will turn amber and will cause the SUPER button on the trainee panel (shown in Figure 5) to flash until the trainee depresses it. When both the ICS and SUPER buttons are depressed, communication is possible. If the trainee wishes to call you, depressing his SUPER button will cause the ICS button to flash until it is depressed.

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!                                                                         !
!                                                                         !
!                                WARNING                                  !
!                                                                         !
! When the trainee's SUPER button is selected (glowing amber), it         !
! physically prevents GCA-CTS from hearing anything the trainee           !
! says. The SUPER button must be deselected to resume training.           !
!                                                                         !
!                                                                         !
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
```

GCA-CTS

IS DIVIDED INTO THREE DISTINCT FUNCTIONAL AREAS

- TRAINEE STATION
- LEARNING SUPERVISOR STATION
- SYSTEM CONTROLLER

Figure 1. GCA-CTS Hardware

8
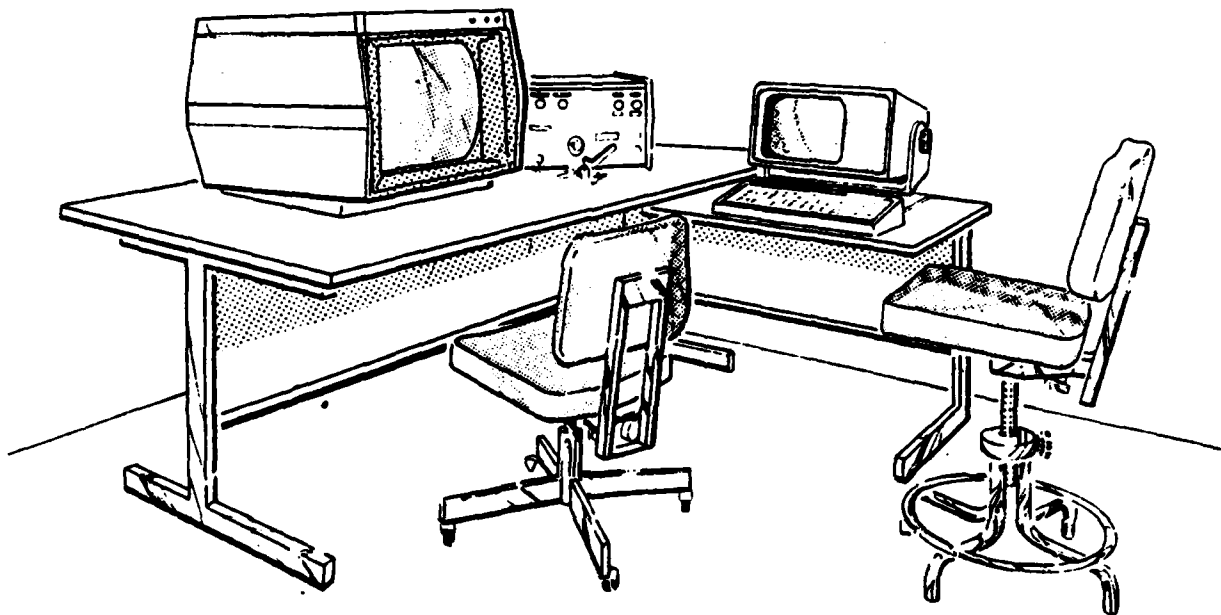
- CRT TERMINAL
- GRAPHICS DISPLAY
- TRAINEE PANEL

Figure 2. The Trainee Station
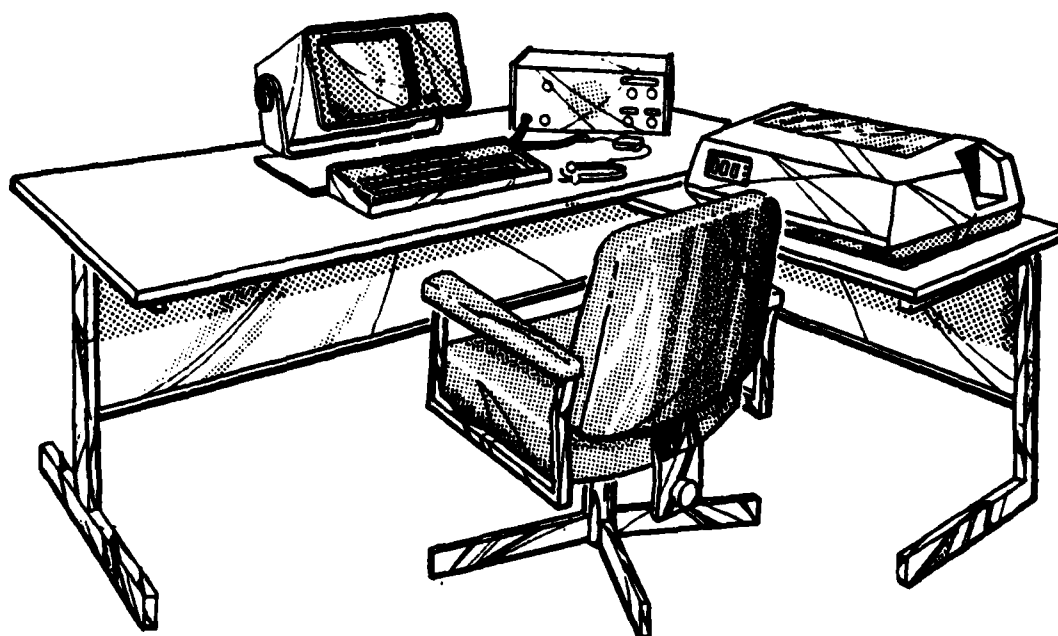
- CRT TERMINAL

- PRINTER

- COMMUNICATIONS PANEL

Figure 3. The Learning Supervisor Station
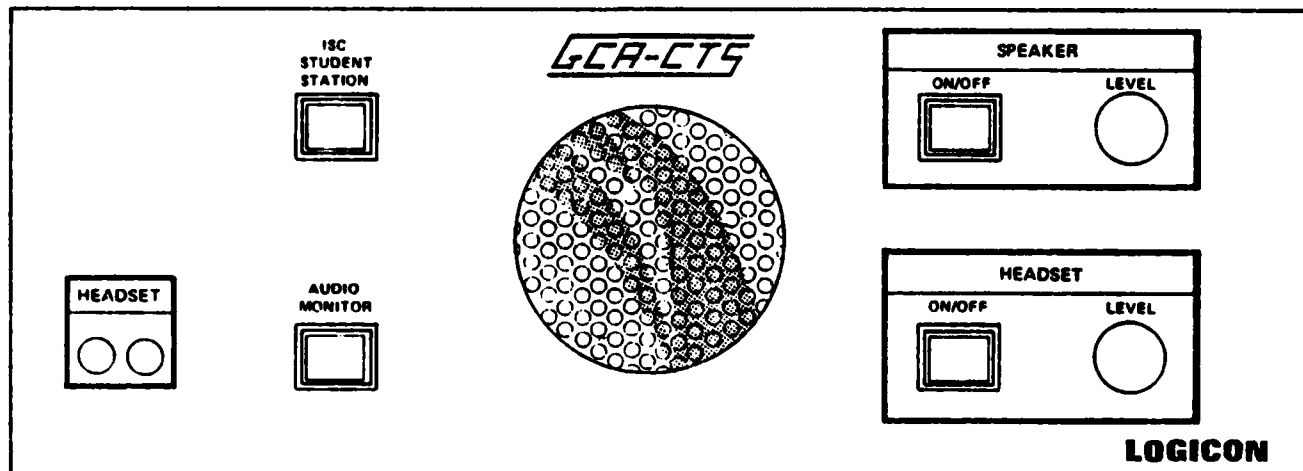
Figure 4.   Learning Supervisor's Communications Panel

11
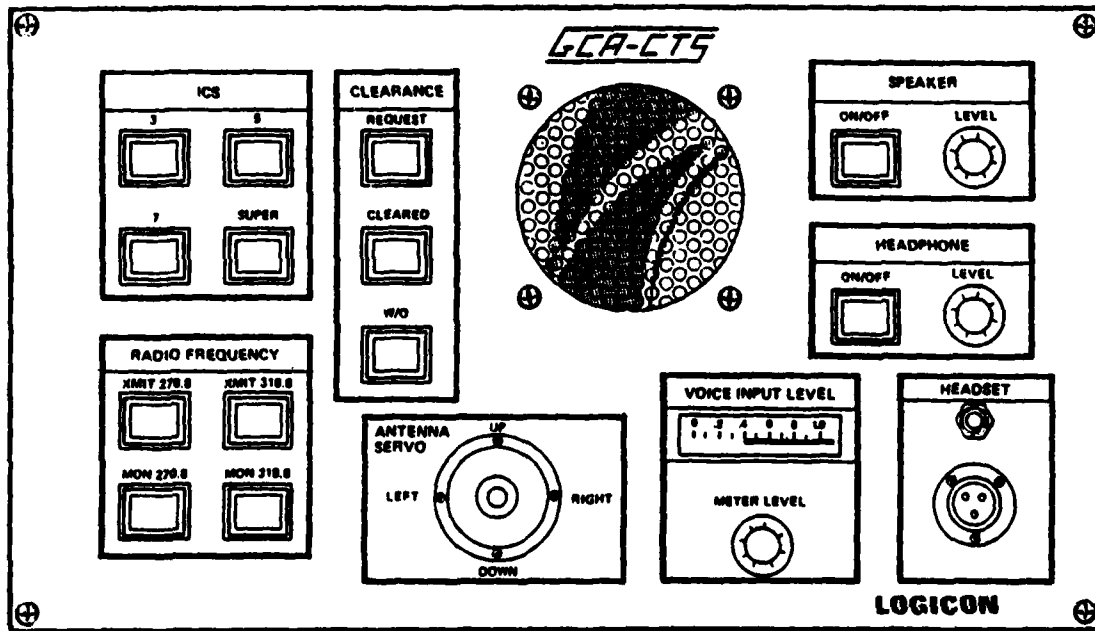
Figure 5. Trainee's Communications Panel

THE SYSTEM CONTROLLER

The "brain" of the GCA-CTS, as well as its "ears" and its "mouth," all reside in the twin-bay equipment rack shown in Figure 6. This rack houses two minicomputers, a cartridge disk drive, two floppy disk drives, a speech synthesizer, a voice input preprocessor, and an audio record/playback unit.

The computer on the right, with 64K 16-bit words of memory, is the training system controller. It selects problems from the syllabus and maintains student records. During practice problems it also does the processing for the aircraft/pilot/environmental (APE) simulation and does the performance measurement tasks. The computer on the left, with 96K words of memory, is devoted primarily to display processing and speech recognition.

The cartridge disk is used to hold the GCA-CTS system files and student records.

The floppy disks are used in system startup procedures and to hold backup copies of student records.

The speech synthesizer serves as the system's voice. It allows GCA-CTS to speak to the trainee. It is used to prompt the trainee and also to take the roles of pattern controller and pilot.

The voice input preprocessor enables the GCA-CTS to hear what the trainee says. It is because of this device that APE is able to maneuver the simulated aircraft in response to the trainee's advisories, and that the GCA-CTS is able to monitor the trainee's performance.

The audio record/playback unit is used to make an audio recording of the trainee's performance on a problem for replay, and is also used as a prompting device.

- **TWO MINICOMPUTERS**

- **CARTRIDGE DISK**

- **FLOPPY DISKS**

- **SPEECH SYNTHESIZER**

- **VOICE INPUT PREPROCESSOR**

- **AUDIO RECORD/PLAYBACK UNIT**

Figure 6.   GCA-CTS System Controller

SECTION III

INSTRUCTIONAL FEATURES OF THE GCA-CTS

OVERVIEW

The GCA-CTS is an automated adaptive training system which provides computer assisted instruction. The figures on the following pages will help explain what the GCA-CTS can do for you.

Figure 7 shows the existing training environment in which a student communicates with a pseudo pilot who in turn controls a simulated aircraft whose target return appears on a PAR indicator.
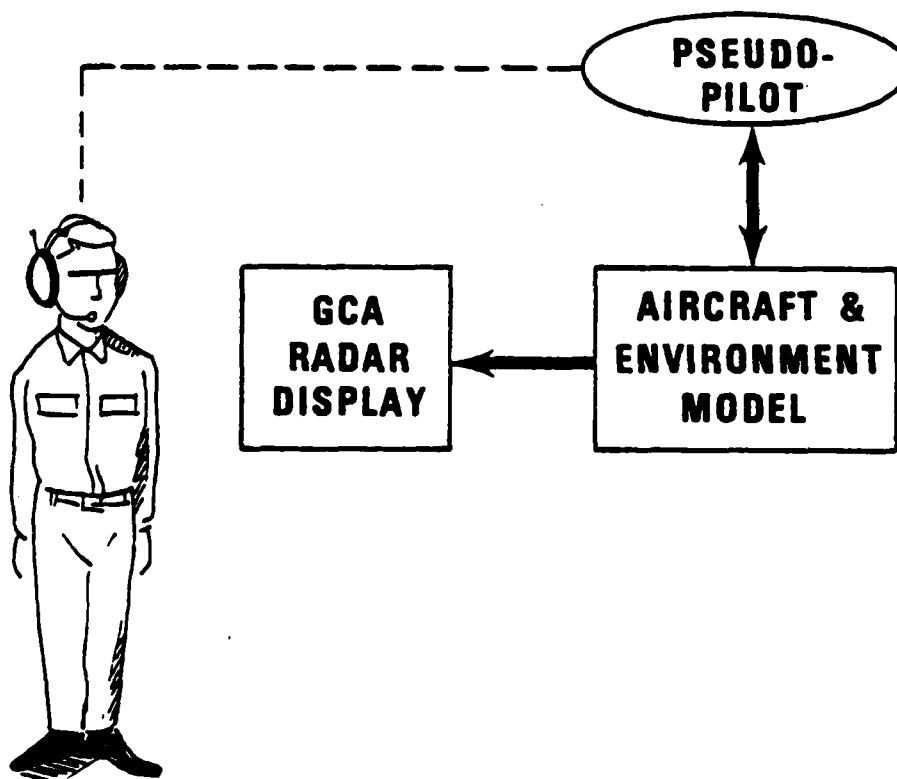
Figure 7. Existing GCA Training

Figure 8 shows how this training has been automated in the GCA-CTS. With the addition of an automated speech recognition capability and voice generation capability it becomes possible to develop a pilot model or simulated pilot to replace the pseudo pilot.
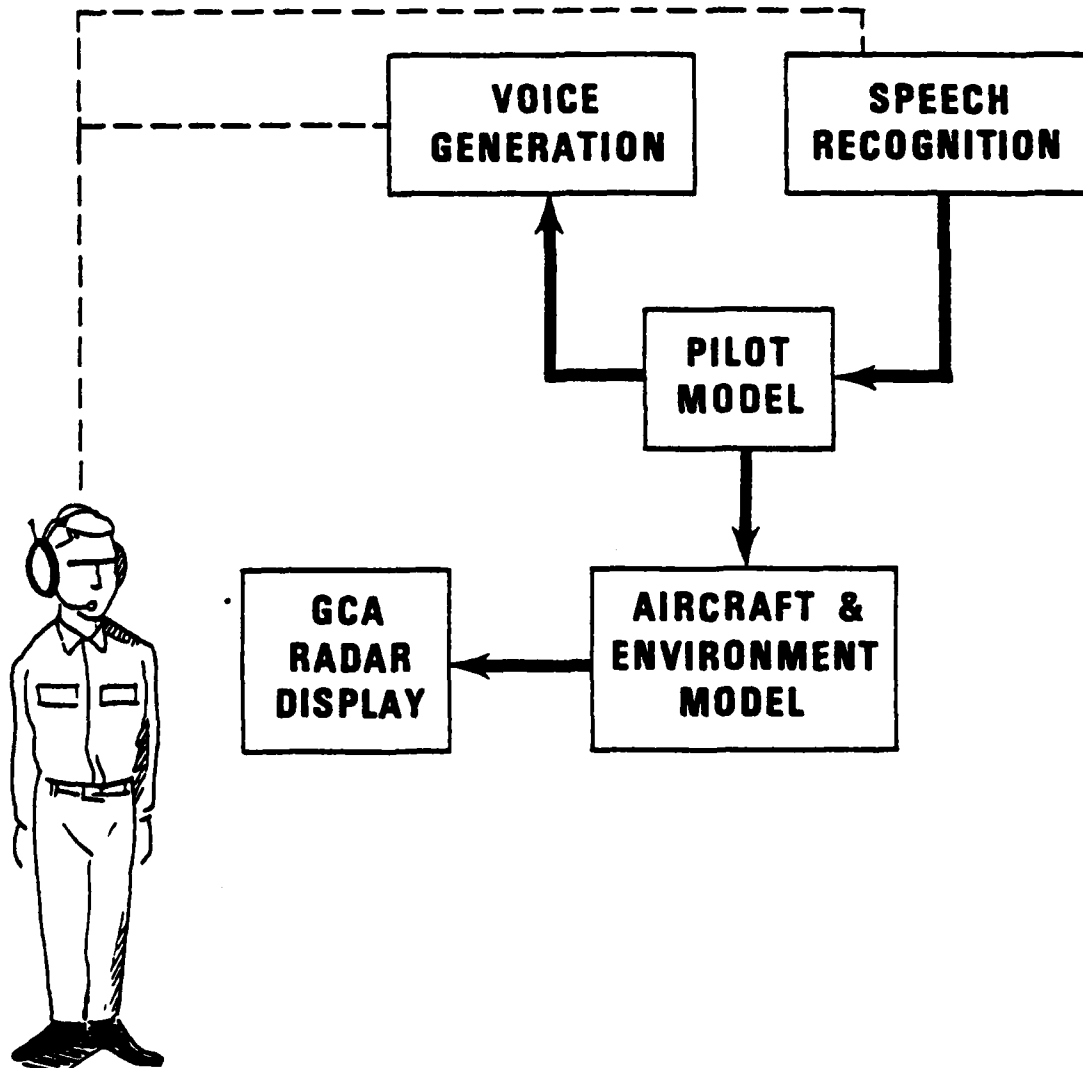
AUTOMATED

Figure 8. Automation of Training

Figure 9 shows how GCA-CTS is able to provide adaptive training as well. The GCA-CTS provides a syllabus from which it draws problems and instructional material. Because of the speech recognition capability, the GCA-CTS is able to compare the trainee's radio transmissions to the set of correct transmissions which is maintained by the simulated GCA controller (model controller). This comparison forms the basis for performance measurement and record keeping. The GCA-CTS can evaluate the trainee's performance and adapt the training syllabus to his or her needs.

AUTOMATED   **ADAPTIVE**
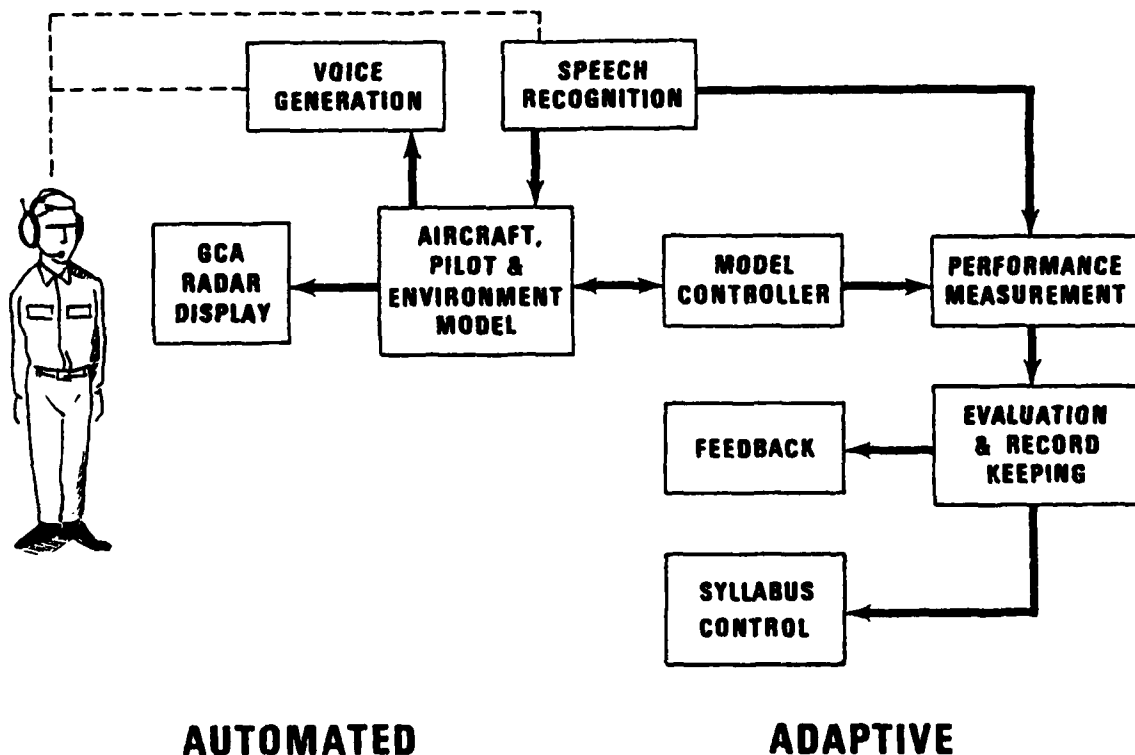
Figure 9. Automated Adaptive Training

Figure 10 shows that, with the addition of the computer assisted in- structional features, GCA-CTS becomes a total training system.

Figure 10. GCA-CTS as a Total Training System
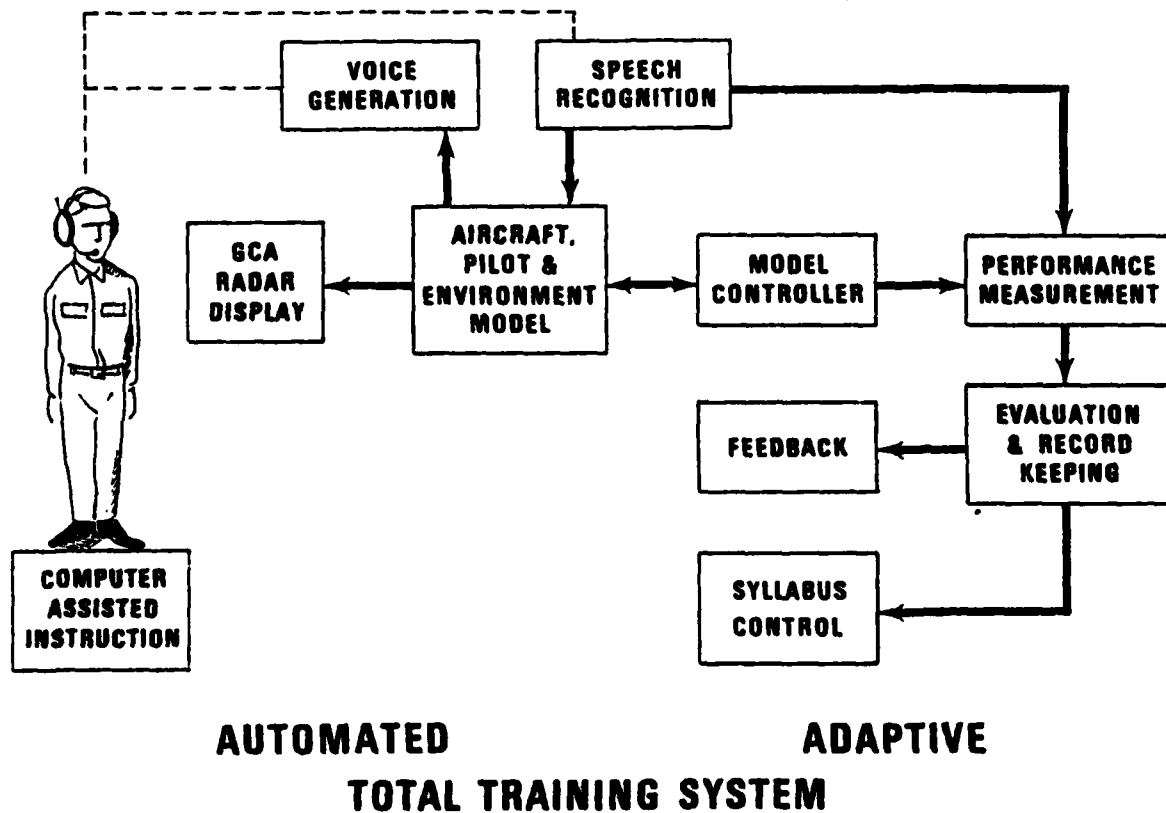
SYLLABUS

The GCA-CTS syllabus is shown in Table 1. The organization of the material corresponds with the Student's Guide. This organization is based upon the principle that the training in GCA control procedures should build in a step by step way upon the training which the student has already had. Figure 11 shows the way the concept of levels of achievement is conveyed to the trainee in the Student's Guide.

In level one, the GCA-CTS provides the new user with an introduction to itself. The importance of this system familiarization step cannot be over emphasized. Although the system is easy to use, it has some limitations in the area of speech recognition. (These are discussed later in this guide.) When the trainee really understands what the system can and cannot do, he or she will be in a position to make effective use of the system capabilities.

After this introduction to GCA-CTS, level two provides an introduction to azimuth control procedures. This is the aspect of PAR control which is most similiar to the trainee's previous experience in ASR. In level two, as you can see, the turn to final is treated as a separate topic. This points out one of the features of the GCA-CTS. With its simulation capabilities, it is possible to allow the trainee to practice just this one aspect of control until he or she achieves proficiency. In these problems, the approach terminates after the turn to final, so intensive practice on this important procedure can be given in a short time frame.

In level three, additional azimuth procedures as well as range call and clearance procedures are taught.

Glidepath control procedures are introduced in level four. In level five, once proficiency has been attained, the five-second rule is introduced. Conformity to this rule should not cause the trainee to become sloppy or nervous at this point because the procedures will have been learned well.

Level six provides practice and a P-Run. The GCA-CTS will grade this P-Run according to the criteria described later in this guide. It is of course up to you as the learning supervisor to judge, given the scores attained, whether the trainee has passed the course. Level seven provides enrichment topics.

As the trainee completes each of these levels of achievement, he or she will have a sense of making progress in the acquisition of GCA control skills. Within each level, the GCA-CTS provides training through a process of conveying information in a step at a time fashion, then giving the trainee the opportunity to practice each new skill and to integrate it with previously learned material.

The tasks within each level convey information in small increments and couple this with good feedback so that the trainee never learns incorrect procedures and doesn't practice making errors. This is accomplished through the various phases of instruction.

TABLE 1.   GCA-CTS SYLLABUS

Level	Description	Task Name*
1	Introduction to GCA-CTS	T01$00.01
	Introduction to the speech system	T01$10.01
	Introduction to the simulated PAR radar	T01$20.01
	Introduction to the simulated PAR controller	T01$30.01
2	Introduction to azimuth control	T02$00.01
	Azimuth PAR alignment	T02$11.01
		T02$12.01
	Handoff acceptance	T02$21.01
		T02$22.01
		T02$22.02
		T02$22.03
	The turn to final	T02$31.01
		T02$32.01
		T02$32.02
		T02$32.03
	Corrections on final	T02$41.01
		T02$42.01
		T02$42.02
		T02$42.03
	Azimuth corrections with wind	T02$51.01
		T02$52.01
		T02$52.02
		T02$52.03
3	Introduction to azimuth position, range and clearance	T03$00.01
	Course position and trend	T03$11.01
		T03.12.01
		T03.12.02
		T03.12.03
	Range calls	T03$21.01
		T03$22.01
		T03$22.02
		T03$22.03
	Clearance request procedure	T03$31.01
		T03$32.01
		T03$32.02
		T03$32.03
	Missed approach procedure	T03$41.01
		T03$42.01
		T03$42.02
		T03$42.03
		T03$43.03

TABLE 1. GCA-CTS SYLLABUS (CONT)

Level	Description	Task Name*
4	Introduction to glidepath control	T04$00.01
	Elevation PAR alignment	T04$11.01
		T04$12.01
	Approach to the glidepath	T04$21.01
		T04$22.01
		T04$22.02
		T04$22.03
	Glidepath transmissions	T04$31.01
		T04$32.01
		T04$32.02
		T04$32.03
	Decision height procedures	T04$41.01
		T04$42.01
		T04$42.02
		T04$42.03
		T04$43.03
5	Introduction to approach termination	T05$00.01
	The five-second rule	T05$10.01
	Landing threshold sequence	T05$21.01
		T05$22.01
		T05$22.02
		T05$22.03
6	Introduction	T06$00.01
	Practice	T06$00.03
		T06$00.03
		T06$00.03
		T06$00.03
	Introduction to the P-Run	T06$10.01
	The P-Run	T06$00.04
7	Introduction to the enrichment topics	T07$00.01
	Low altitude alert	T07$11.01
		T07$12.01
		T07$12.02
		T07$12.03
	Servoing to maintain radar contact	T07$21.01
		T07$22.01
		T07$22.03

21

TABLE 1. GCA-CTS SYLLABUS (CONT)

Level	Description	Task Name*
7	No-gyro approach	T07$31.01
(Cont)		T07$32.01
		T07$32.02
		T07$32.03
	Practice	T07$40.01
		T07$40.03

* These task names are actual disk file names which are coded as follows: All begin with "T" followed by a two digit level. The "$" serves as a separator. The next two digits give the problem number. The ".XX" extension gives the phase of instruction.
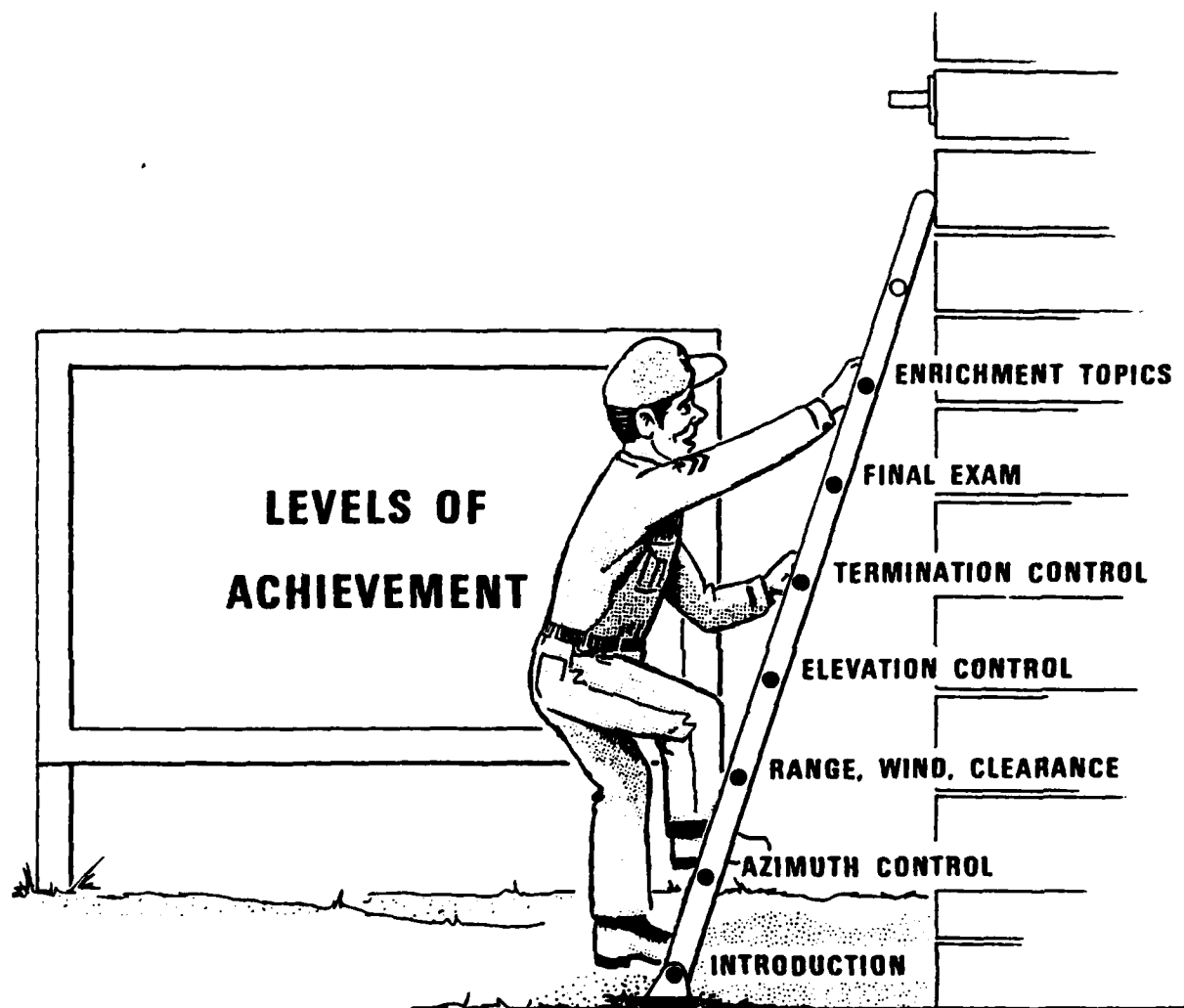
Figure 11. GCA-CTS Levels of Achievement

PHASES OF INSTRUCTION

As shown in Table 1, each of the levels of achievement contains several tasks. These tasks specify what form of instruction or practice experience is to be given. The GCA-CTS is capable of providing several types of learning experiences or "phases of instruction." These are shown in Table 2.

TABLE 2. GCA-CTS PHASES OF INSTRUCTION

Phase	Description
1	Interactive teaching and voice data collection
2	Commented practice or "freeze and feedback"
3	Graded practice
4	Performance test

PHASE 1. An overview of phase 1, the interactive teaching and voice data collection mode, is shown in Figure 12. In this phase of instruction, the system will review the materials covered in the Student Guide, give demonstrations, and collect voice reference patterns.

In order to recognize the trainee's voice, the system must have samples of the way the trainee says each phrase on file. So it could be said that the GCA-CTS must "learn" to recognize the trainee. It is also true that the trainee must learn to use the GCA phraseology. Whenever possible, these two requirements are combined and GCA-CTS learns to recognize the trainee while the trainee learns to use the phraseology.

PHASE 2. This optional phase provides the trainee with commented practice. After a new topic is presented, the system offers the trainee the opportunity to practice the new material under the watchful guidance of the GCA-CTS. As shown in Figure 13, if a mistake is made on the new material, the problem is stopped and the error is explained. The system then restarts the problem from the beginning up to three times. If an error is made on previously learned material, it is ignored during this phase.

PHASE 3. Figure 14 gives an overview of the graded practice phase of instruction. In this phase, simulated control situations are presented and the trainee practices whatever skills he or she has acquired at that point in the syllabus. After the approach, feedback is given about the trainee's performance on the new and previously learned material as shown in Figure 15. A replay of the problem is then offered. The trainee can choose to observe the replay with or without the error reporting feature. This replay recreates all aspects of the approach. An actual recording of the trainee's voice is played back in sync with the aircraft dynamics. The lights on the

24
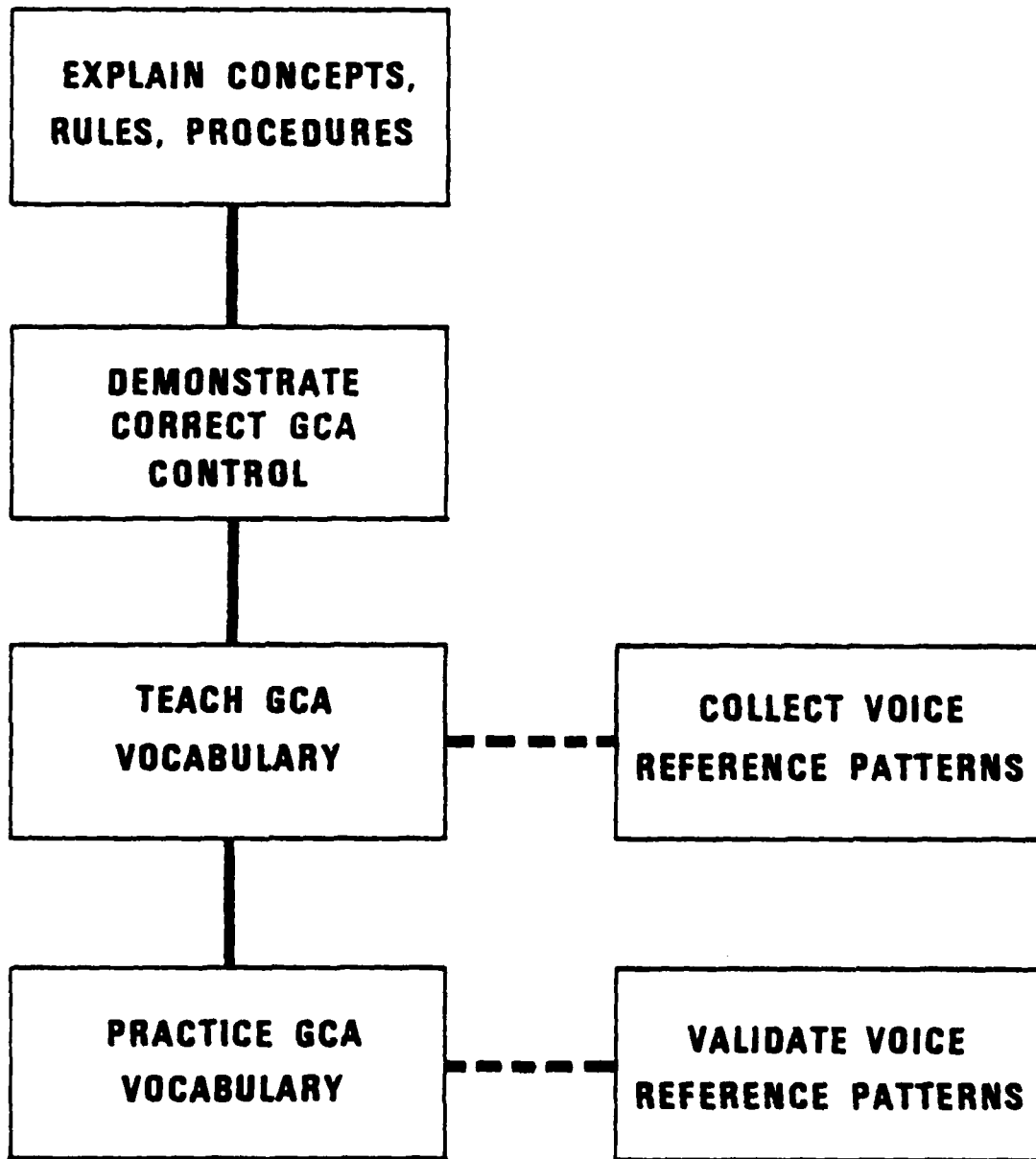
Figure 12. Phase 1: Interactive Teaching and Voice Data Collection
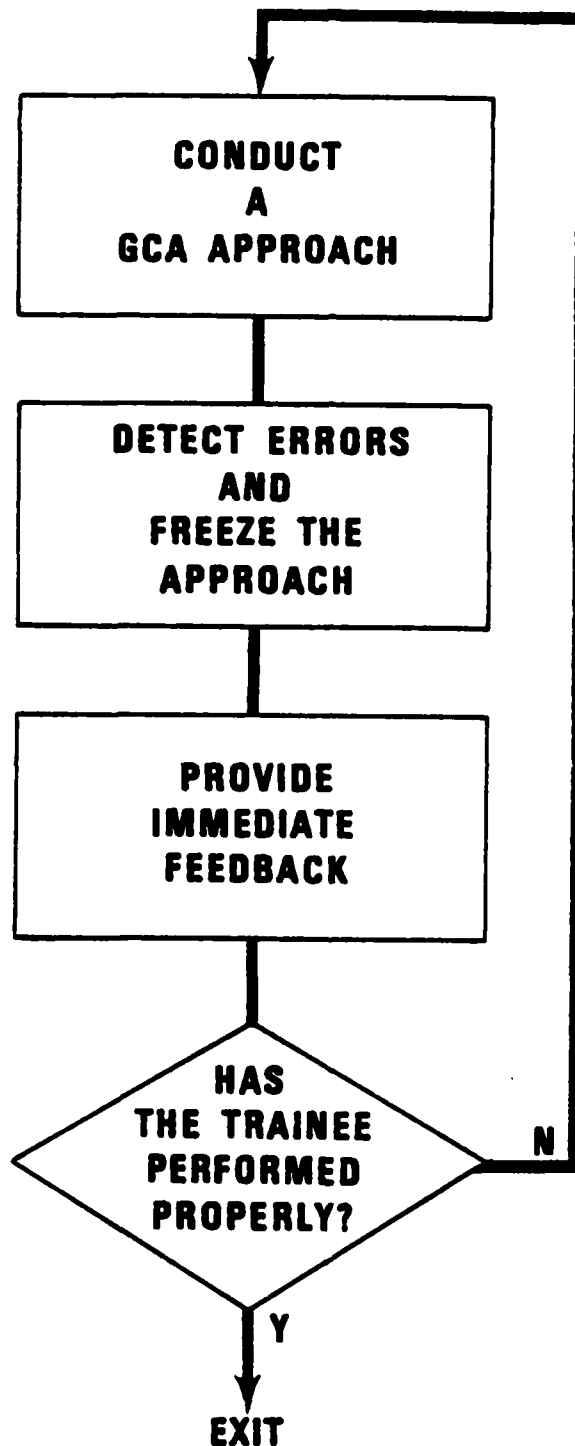
Figure 13. Phase 2: Commented Practice ("Freeze and Feedback")

```
         ┌──────────────────────────────────────────┐
         │                                          │
         ▼                                          │
┌──────────────────┐                                │
│   CONDUCT A       │                               │
│      GCA          │                               │
│   APPROACH        │                               │
└──────────────────┘                                │
         │                                          │
         ▼                                          │
┌──────────────────┐                                │
│    MEASURE        │                               │
│    STUDENT        │                               │
│  PERFORMANCE      │                               │
└──────────────────┘                                │
         │                                          │
         ▼                                          │
┌──────────────────┐                                │
│ PROVIDE FEEDBACK  │                               │
│       AT          │                               │
│   END OF RUN      │                               │
└──────────────────┘                                │
         │                                          │
         ▼                                          │
┌──────────────────┐                                │
│ ALLOW TRAINEE TO  │                               │
│  WATCH/LISTEN     │                               │
│  TO A REPLAY      │                               │
└──────────────────┘                                │
         │                                          │
         ▼                                          │
      ╱────────╲                     ┌──────────────────────┐
     ╱   HAVE    ╲        N          │     ADAPTIVELY       │
    ╱  STANDARDS  ╲──────────────────│  ADJUST APPROACH     │
    ╲    BEEN     ╱                  │    PARAMETERS        │
     ╲   MET?    ╱                   └──────────────────────┘
      ╲────────╱
         │ Y
         ▼
       EXIT
```
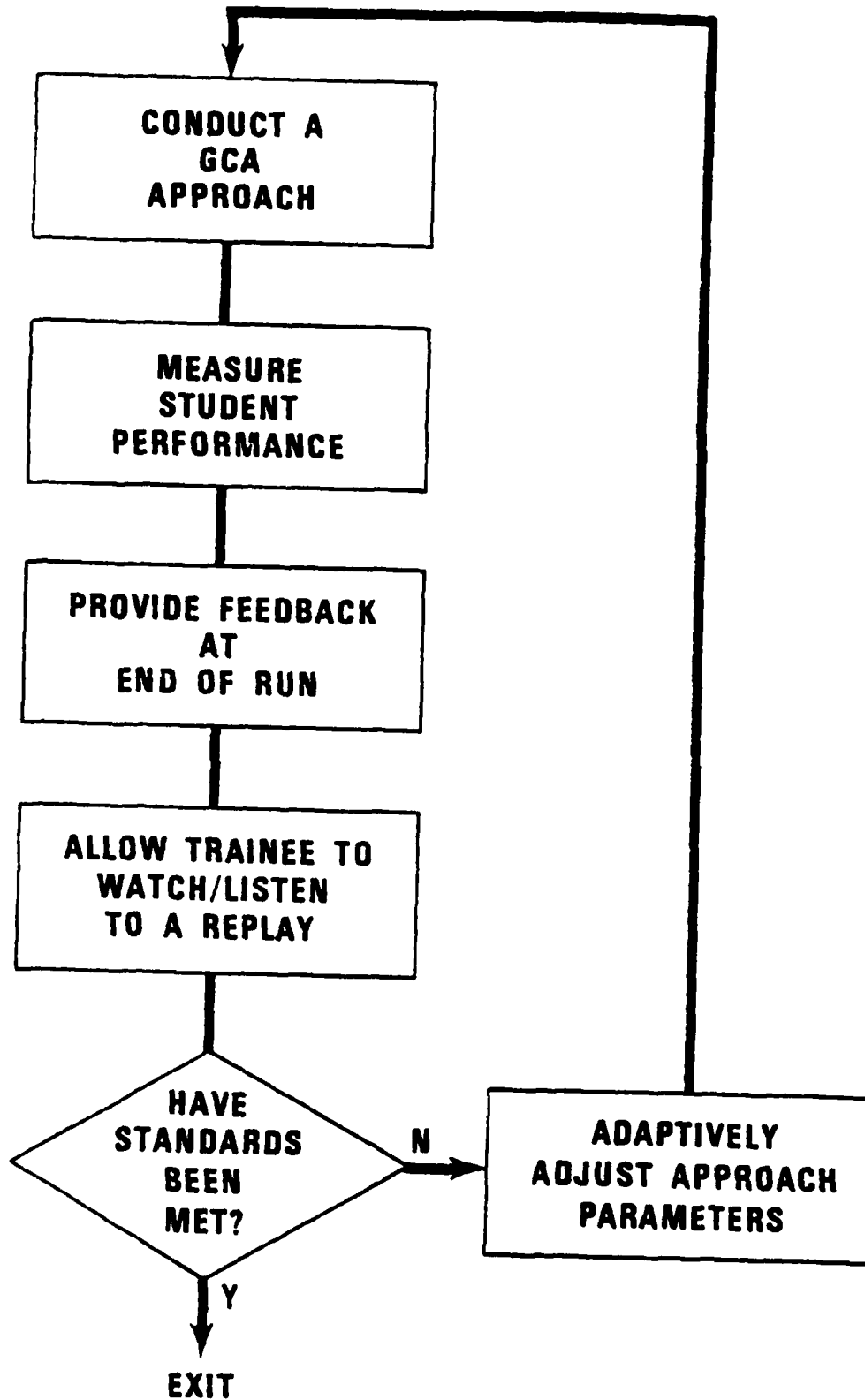
Figure 14.   Phase 3:   Graded Practice

27

PERFORMANCE FEEDBACK

You have completed 3 of the problems in task: T04$32.03
You must complete a minimum of 5 problems but not more than 10
   problems.
Your performance on new material:
      Glidepath position and trend   Needs work
Your performance on other tasks:

Accepting handoff	Perfect
Radio check	Perfect
Turn-to-final	Perfect
Approaching glidepath	Satisfactory
Heading transmissions	Perfect
Azimuth position and trend	Satisfactory
Range calls	Perfect
Clearance	Needs work
Handoff and rollout	Satisfactory
Transmission break	Perfect

Figure 15.   Sample Feedback Given to the Trainee After Every
             Graded Practice Problem

communications panel turn on and off at the appropriate time to recreate the
trainee's selections. If the error reporting feature was selected, the replay
stops when an error is detected and the error is explained on the CRT. (Note:
the SUPER light changes are not replayed. This light always reflects the
present state of the button. This means you can always contact the trainee
over the ICS, no matter what else is going on.) The trainee can see as many
replays of a problem as he or she wants, but once the trainee signs off or
goes on to the next problem, the replay files are destroyed. (The P-Run
replay files constitute an exception to this rule. This will be discussed
below.)

After every problem, the system evaluates the trainee's performance on
the previously learned material. If this performance is significantly less
than the average performance attained in the previous task, it is assumed that
the trainee is having trouble integrating the new material with the old. GCA-
CTS then adjusts the difficulty of the upcoming problem in such a way that the
skill he or she is having trouble with will be easier to apply. For each of
the skill categories shown in Table 3, the system asks: Is the student's per-
formance significantly worse than it was on the average in the last phase 3
task? If the answer is yes, then the adjustments shown in the table are made.

TABLE 3.   ADAPTIVE PROBLEM SELECTION

Skill Category	Adaptation Applied
Heading transmissions	Set wind variability, correlation time and gusting to easiest values.
Azimuth position and trend	Select best pilot, slowest aircraft
Glidepath position and trend	Select best pilot, slowest aircraft
Range calls	Select slowest aircraft

When the minimum number of approaches specified for the task have been completed, GCA-CTS will ask whether the student's performance meets the criteria established for the new material at this level. If not, another problem is given. This continues until the student's performance reaches the criteria, or until he or she has completed the maximum number of problems for the task.

When the trainee has completed the requirements for a particular task, the system either advances him or her to the next task, or selects an appropriate remedial exercise. Remediation is chosen if the trainee's average score on the previously learned material for this task does not meet the established criteria. The remedial problem or problems selected depend upon the skill category for which the low score was obtained, and upon the level which has been reached in the syllabus.

The skill categories used were derived from the GCA-CTS Training/ Functional Design Report (NAVTRAEQUIPCEN 77-C-0162-1). Appendix A gives a complete list of these categories and the scoring which is applied to each of the components of the skill. Table 4 shows the scoring criteria applied at the various levels of achievement. Alignment procedure scoring (skill category 19) is not shown in this table because it is an unusual case. Once the trainee learns all of the alignment check procedures in level four, the system then presents an alignment check problem every time the trainee signs on to the system. This is done automatically, and the trainee must remember to perform at the appropriate time (that is, after sign on, and after the target under the simulated PAR controller's control has completed its approach). Feedback is given before the next problem is presented.

PHASE 4. This is the performance test or P-Run. It is, in most respects, exactly like a phase 3 problem. There are a couple of added features however. First, after the P-Run, a special report of the trainee's performance is automatically sent to the printer. A portion of this printout is shown in Figure 16. It gives an account of all the verbal interchange between the pattern

TABLE 4. CRITERIA FOR ADVANCEMENT USED IN THE CGA-CTS LEVELS OF ACHIEVEMENT

Performance Category	Level of Achievement					
	2	3	4	5	6	7
1	90	80	80	90	90	80
2	90	80	80	90	90	80
3	90	80	80	90	90	80
4	--	--	90	90	90	80
5	70	80	80	90	90	80
6	--	70	70	80	90	80
7	--	--	70	80	90	80
8	--	70	80	80	90	80
9	--	--	90	90	90	90
10	--	90	80	80	90	80
11	--	--	--	80	80	80
12	--	80*	60	80** 60	80	80
13	--	--	--	--	--	80
14	--	--	--	--	--	80
15	--	--	100	75	75	75
16	--	--	--	--	--	80
17	--	--	70	80	90	80
18	--	--	--	80	90	90

* Missed approach handoff only
** Rollout only

PERFORMANCE RUN SUMMARY REPORT

NAME: HICKLIN

DATE: 8-16-1979   TIME: 1855

REC	SPKR	RANGE	TIME	ADVISORY
8	PTN	9.5	0	Position 4 Hand off Right base
9	PTN	9.5	0	Marine 687 A6 Low approach Button 1
19	GCA	9.5	11	Position 4 roger.
***			11	REFERENCE # 1 Handoff not acknowledged within 10 secs of issuance
21	PTN	9.5	15	Marine 687 After completing Low approach Climb and maintain 1500
22	PTN	9.5	15	Turn right heading 2 7 0
23	PTN	9.5	15	Over
26	PLT	9.5	27	Roger
30	PTN	9.5	28	Marine 687 Turn right heading 150
31	PTN	9.5	28	Over
34	PLT	9.5	35	Roger
45	GCA	8.6	68	Marine 687 Radar button 1.
***			78	REFERENCE # 2 Proper frequency not selected for radio contact

Figure 16.   Sample P-Run Report

31

controller (PTN), the pilot (PLT), and the trainee (GCA), and notes the errors detected. The error report includes a reference number which is actually the number of the skill category being scored (from Appendix A). Appendix B gives the cross reference between these category numbers, the corresponding discussion in the Student Guide, and the course level in which the material was introduced.

The second major difference between the P-Run and ordinary phase 3 problems is that the replay files are saved. You can review the student's P-Run at any time simply by depressing the REPLA key at the learning supervisor station. This procedure is described in detail in a later section.

MAINTENANCE OF STUDENT RECORDS

GCA-CTS always keeps track of the trainee's progress in the syllabus. This information is actually kept on the disk which you assign to the trainee. After the initial step of introducing the trainee to the system (using the NEW T/E key as described later), you do not need to worry about maintaining student records - GCA-CTS does that for you!

At your request, the GCA-CTS will prepare reports about the trainee's status. There are four types of reports which differ in level of detail. The first type of report, shown in Figure 17, is a summary of the trainee's performance on the last graded practice task completed. The summary also shows whether or not remediation was needed, what task the trainee is presently working on, and the system time the trainee had used up until the time he or she last signed on.

The second type of report is a task performance report which gives the actual scores achieved in each skill category for each problem in that task. An example of the printout is shown in Figure 18. Notice that the skill category abbreviations used in the column headings are spelled out more fully in the note at the bottom of the printout. There's no need to refer to a handbook to interpret these printouts!

The third type of report which GCA-CTS offers is a detailed review of the trainee's performance on a particular problem, as shown in Figure 19. Here the scores are printed along with an explanation of each error that was made.

The fourth type of report, shown in Figure 20, is intended primarily for research purposes. It is very much like the second type, but provides additional information about the training environment.

These reports are produced when you request STATS or PRINT STAT at the learning supervisor station. The actual use of these keys is described in a later section.

NAME: HECKLIN   MARY   DATE: 8 16 1979   TIME:1819

PRESENTLY WORKING ON PROBLEM: 2 OF TASK:T08$05.03

SUMMARY FOR TASK: T08$04.03
                        PERFORMANCE ANALYSIS:
STRENGTHS   BORDERLINE   WEAKNESSES

AZIMUTH POSITION/TREND   HEADING ADVISORIES   CLEARANCE REQUESTS
RANGE CALLS   .

STUDENT WAS ADVANCED TO PRESENT LEVEL AFTER COMPLETING 3 RUNS
NO REMEDIATION NEEDED

TOTAL SYSTEM TIME TO DATE: 0 HOURS AND   0 MINUTES

Figure 17.   Sample Task Summary Report

PERFORMANCE ON TASK: IDB3U4.03

NAME: HICKLIN   MARY

DATE: 8 16 1979

TIME: 1759

KIND	NO.	RCh	TTF	AGr	HO	AFT	GFT	RCJ	DH	CI	OLf	HR	NG	HC	LM	LAA	TB	TK
1					80	100		100		50								
2					100	100		100		70								
3					80	100		100		0								

Explanations of abbreviations:
HO=Handoff; RCh=Radio check; TTF=Turn-to-final; AGr=Approaching sliderath; HA=Heading
advisories; AFT=Azimuth position and trend; GFT=Glidepath position and trend; RCJ=Range call;
DH=Decision height; CI=Clearance; OLf=Over-landing threshold; HR=Handoff and rollout;
NG=No go; HC=Heading corrections; LM=Emergency waveoff; LAA=Low altitude alert; TB=Transmission break; TK=Transmission...

Figure 18. Sample Task Performance Report

34

PERFORMANCE ON PROBLEM 4 OF TASK: 103404.0?

TIME: 3/?9

NAME: HUTTON

DATE: 8 16 197?

SUBJECT AREA	SCORE	ERRORS
HEADING ADVISORIES	80	Heading given in a "heading..." advisory not the same as previous ...
AZIMUTH POSITION AND TREND	100	NONE
RANGE CALLS	100	NONE
CLEARANCE	0	Clearance was not requested

Figure 19. Sample Problem Performance Report

NAME: JONES   JOHN   PERFORMANCE ON TASK: TOISOJ.01   MIN 5 MAX 1

DATE: 2- 8-1980   TIME: 1400

RUN#	HD*	RCh	TTF	AGp	HA	APT	GPT	RCa	DH	CI	OLT	HR	NG	HC	EW	LAA	TB	TR
7	1-18-1980	2	0840	NR	C2	ADAPTED -				180	10	5	3	W				
	T38	96	SI	FB														
	87		04																

*Explanations of abbreviations:
HD=Handoff; RCh=Radio check; TTF=Turn-to-final; AGp=Approaching glidepath; HA=Heading
transmissions; APT=Azimuth position and trend; GPT=Glidepath positon and trend; RCa=Range calls;
DH=Decision height; CI=Clearance; OLT=Over-landing-threshold; HR=Handoff or rollout;
NG=No-gyro; HC=Heading corrections; EW=Emergency waveoff; LAA=Low altitude alert; TB=Transmission break;
TR=Transmission rate

Figure 20. Sample Expanded Task Summary Report

SECTION IV

SYSTEM CAPABILITIES

There are several important GCA-CTS capabilities which enable the system to perform its training functions. These are:

- Speech understanding

- Computer generated voice

- Aircraft/Pilot/Environment Simulation

- Simulated PAR display

- Simulated PAR controller.

These capabilities are described in the paragraphs that follow.

SPEECH UNDERSTANDING

The one GCA-CTS capability which makes it unique among training systems is its ability to recognize human speech. To give you a general idea of how speech recognition works, the speech input preprocessor (which is mounted in the left bay of the system controller equipment cabinet just above the computer) samples the trainee's speech about 500 times a second and checks for the presence or absence of 30 features or characteristics. It sends this information on to the computer which stores the data. When the speech preprocessor detects a 1/4 second silence, it informs the computer that the phrase is complete. The computer then takes all these samples and compresses them into a standard-sized pattern. It then compares this new pattern to all the patterns which it has on file for the particular speaker. When it finds a close match between the new pattern and one of the stored reference patterns, it concludes that it has recognized the input phase.

As you can see, two assumptions are made: 1) that a reference pattern exists for the spoken phrase, and 2) that the phrase be spoken in its entirety and followed by a pause of 1/4 second. This explains why the GCA-CTS must collect voice data before it can recognize the trainee. It also explains why the trainee must conform to the simple stylization requirements.

The relatively new technology which makes speech recognition possible has previously been applied only in the laboratory and in commercial facilities with trained users. The lab studies have shown that this technology is ready for a field trial, but the fact remains that this experimental prototype system is the first to employ the technology in a training system with naive users and an extensive vocabulary. It is safe to say that every effort has been made to make the speech recognition technology work in the GCA-CTS environment. (See for example "User Acceptance in an Automated Speech

Technology Based Training System," 11th NAVTRAEQUIPCEN/Industry Conference, Nov. 14-16, 1978, NAVTRAEQUIPCEN IH-306.) It is obvious that the GCA-CTS can only provide training if the trainee learns to make use of the speech system. Making effective use of speech recognition really isn't difficult at all, but it does require that the user understand and conform to the limitations of the technology. The rules for good speech recognition are summarized in Appendix C for quick reference. Probably the most important point is this: There is a phenomenon of learning to talk to the machine. The long list of rules given in Appendix C is only an attempt to systematize this phenomenon:

THE BEST WAY TO GET GOOD SPEECH RECOGNITION

IS TO SPEND 10 MINUTES LEARNING

TO TALK TO THE SYSTEM!

It really isn't hard at all, but the new user must take advantage of the opportunity to practice the R/T, and explore the system's capabilities and limitations. It is for this reason that the INIT VOICE TEST key is provided — any time that the trainee suspects that speech recognition is not working very well, this key should be used. Usually a few minutes practice will cure the problem. If however, this validation reveals that a particular phrase isn't being recognized, assuming the voice meter level is properly set and the microphone positioned well, it means that the voice reference pattern is not good. Although the system is fairly forgiving, this can happen if the trainee was careless during the voice data collection phase. The NEW R/T key (described below) enables you to correct the problem.

The GCA-CTS does not depend only on the speech recognition hardware for deciding what the trainee says. Once in a while, the speech recognition system says, in effect, "I'm not sure what was spoken — it might have been phrase X or it might have been phrase Y." When this happens, the speech understanding system tries to make sense out of it and choose the phrase that the trainee is more likely to have used. In general, whenever there is a chance that there was a recognition confusion, GCA-CTS always gives the trainee the benefit of the doubt.

COMPUTER GENERATED VOICE

The GCA-CTS has two ways of speaking to the trainee. The first is the voice synthesizer. This device is used to produce the simulated pilot's voice. The system also has the capability to record and play back the trainee's own voice. This feature is used in two important ways. First, it is used to prompt the trainee during voice data collection. For good speech recognition, it is important to get natural-sounding samples of the trainee's speech. Letting the trainee prompt himself is a way to encourage him to speak naturally during the voice data collection phase.

The record playback feature is also used to preserve the trainee's transmissions for replay. This is an important feature for several reasons:

- It enables the trainee to observe his or her own performance exactly as it occurred.

- It helps the trainee to understand why misrecognitions due to stylization errors occurred.

- It enables the learning supervisor to observe a replay of the P-Run and correct misrecognitions if necessary.

AIRCRAFT/PILOT/ENVIRONMENT SIMULATION

The GCA-CTS aircraft/pilot/environment simulation (APE) provides the information required to paint a realistic target on the simulated PAR display, and also generates the pilot's verbal responses. There are four aircraft in the system, as shown in Table 5.

TABLE 5. AIRCRAFT USED IN THE GCA-CTS

Call Sign	Aircraft Type	Approach Speed (Kts)
Army 876	U-21	98
Marine 687	A6	115
Navy 310	P3	130
Air Force 307	T38	156

There are five pilots who fly for GCA-CTS. These pilots have varying degrees of skill. One is very good at making GCA approaches and responds quickly and accurately to the trainee's transmissions. One has very poor skills. The other three fall in between. This enables GCA-CTS to provide a wide range of control situations. Usually the GCA-CTS assigns a good pilot when the trainee is just learning a skill, then it gives some problems in which a less-skilled pilot makes things harder for the trainee.

The pilot will respond to a transmission (unless a non-critical transmission is disregarded to simulate a garbled transmission) if:

- The proper radio frequency is selected

- The mike is keyed during the transmission

- Correct phraseology and stylization is used so that the transmission is recognized.

If the trainee concludes the transmission with "(pause) over" and unkeys the mike, the pilot will give a verbal response as shown in Table 6. NOTE: If the pilot does not understand what is spoken, and "over" is used, he will respond to the last transmission that was <u>understood</u>.

TABLE 6.   PILOT VERBAL RESPONSES (PILOT RESPONDS "ROGER" TO TRANSMISSIONS NOT SHOWN IN THIS TABLE)

Controller Transmission	Pilot Verbal Response
"If runway not in sight, execute missed approach...over"	"Roger, runway in sight"
	or
"If runway not in sight, climb and maintain...over"	"Roger, missed approach"
"At decision height...over"	
"Radar contact lost...over"	
"This is your final controller how do you hear me?"	"Loud and clear"
	or
	"Loud and clear, wheels down and locked"
	or
	"Weak but clear"
	or
	"Weak but clear, wheels down and locked"
"How do you hear me now?"	"Loud and clear"
	or
	"Weak but clear"*
"Wheels should be down...over"	"Roger, wheels down and locked"
"Turn right heading...over"	"Roger, turn right heading..."
"Turn left heading...over"	"Roger, turn left heading..."
"Heading...over"	"Roger, heading..."

* The pilot will also use this phrase if three transmissions are heard for which the voice input level is low, and if the trainee unkeys so he can get through.

The GCA-CTS pilot assumes lost communications if he does not hear the trainee speak, cough or key the mike for a given period of time. This time period varies in different levels. The trainee is not actually required to conform to the five-second rule until level five. If the pilot does have to assume he has lost radio contact, he executes a missed approach. Although in real life the pilot might not take such a drastic step, here it brings home to the trainee the seriousness of failing to abide by the rule.

The environment simulation provides the capability to simulate everything from an artificial, no-wind situation to extremely realistic wind conditions with steady or variable winds and varying amounts of gusting.

SIMULATED PAR DISPLAY

The simulated PAR display provides a realistic simulation of an operational PAR indicator. The simulation is very precise in the sense that the target behavior is realistic and the servos work like the operational radar servos. There are several features of the simulation which enhance training effectiveness:

- Any part of the display can be shown. Thus for example in some problems, only the azimuth display is turned on. The target trail can even be shown flying along without the target! This latter feature is useful for drawing the trainee's attention to the relevant stimulus in azimuth control.

- The servos can be turned off so that in early levels the trainee can concentrate on control procedures without worrying about having to servo to maintain radar contact.

- The sweep is not shown, although target position is updated at the sweep rate. The sweep is not a relevant stimulus and may prove distracting, so it was omitted in this primary trainer.

- After an approach, a trail of the target position throughout the approach is displayed. The effect is much the same as that produced by the persistence of the phosphor after an approach in which the gain was turned up on an operational indicator, except that the long trail stays up as long as the trainee wants. This gives an overview of the effectiveness of the control measures which were applied.

SIMULATED PAR CONTROLLER

The simulated PAR controller gives demonstrations in phase 1 and also when no trainee is signed on to the system. Thus when the trainee signs on, it is as though he or she was entering an operational radar environment. This supplies the appropriate stimulus for eliciting the required alignment checking response.

SECTION V

HELPS FOR THE LEARNING SUPERVISOR

When the GCA-CTS program is running, the special function keys on the learning supervisor and trainee keyboards are available for use. The layout of the keyboards is shown in Figures 21 and 22, respectively. A few of these keys (YES, NO, NEXT) are used to respond to direct system questions or requests. The rest have special functions and are described in the pages that follow.

To request one of these special functions, just strike the key. Whenever additional information is requested such as the trainee's name, you must tell the system when your entry is complete by striking the carriage return key. This is shown in the following discussions by the symbol [CR].

Key: MENU

When active: Always

Purpose: To display the list of legal keyboard entries. If the INIT T/E KBRD function has been selected, the MENU selections at the trainee station will include the learning supervisor keys.

User dialog: None

Error conditions: None
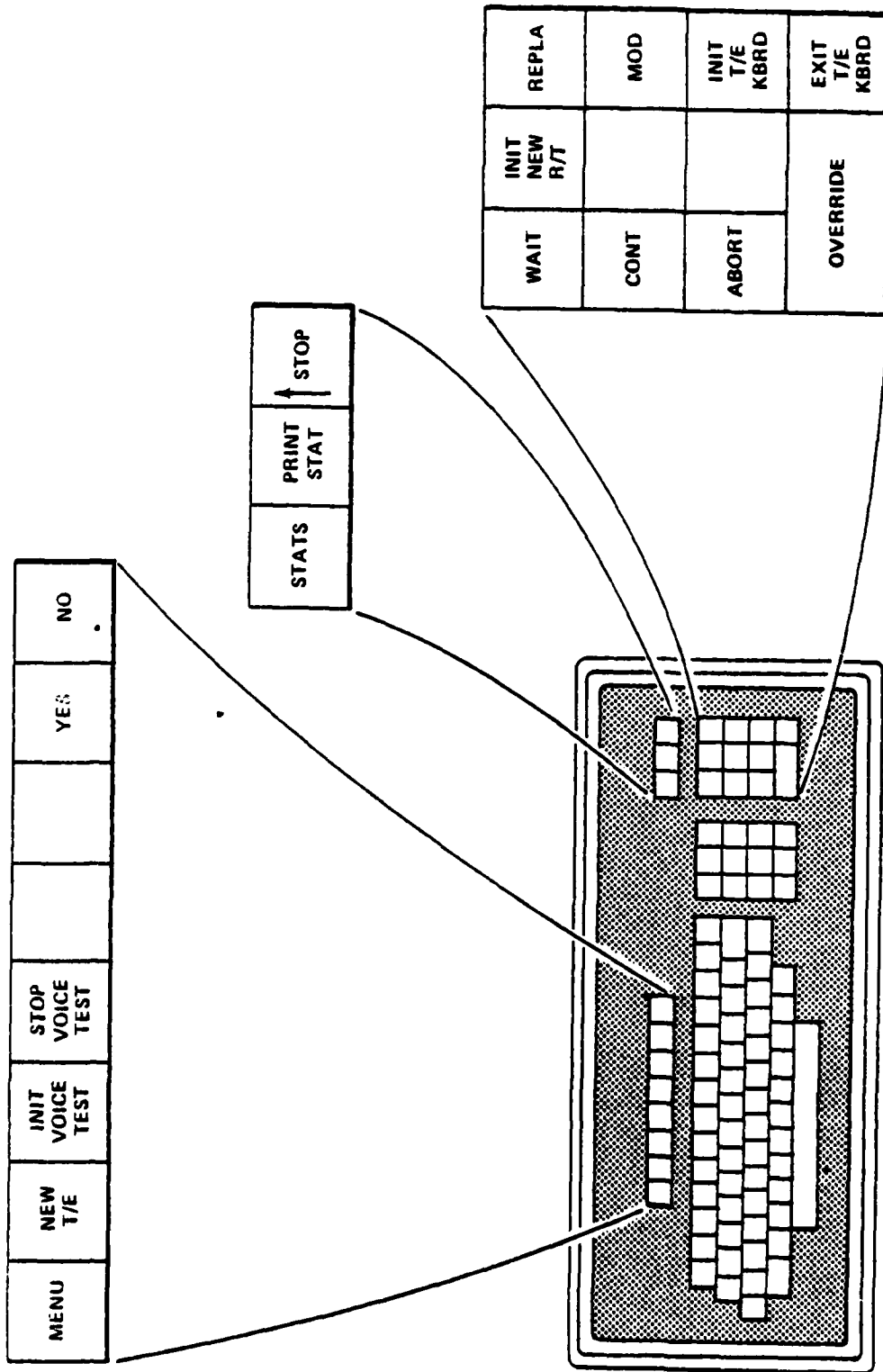
Figure 21. Learning Supervisor Keyboard Layout

MENU	HELP	INIT VOICE TEST	STOP VOICE TEST	ALIGN	NEXT	YES	NO

KEYS FOR TRAINEE USE

	HELLO	BYE

KEYS FOR LEARNING SUPERVISOR USE ONLY

WAIT	INIT NEW R/T		
CONT			
ABORT			
OVERRIDE			EXIT T/E KBRD
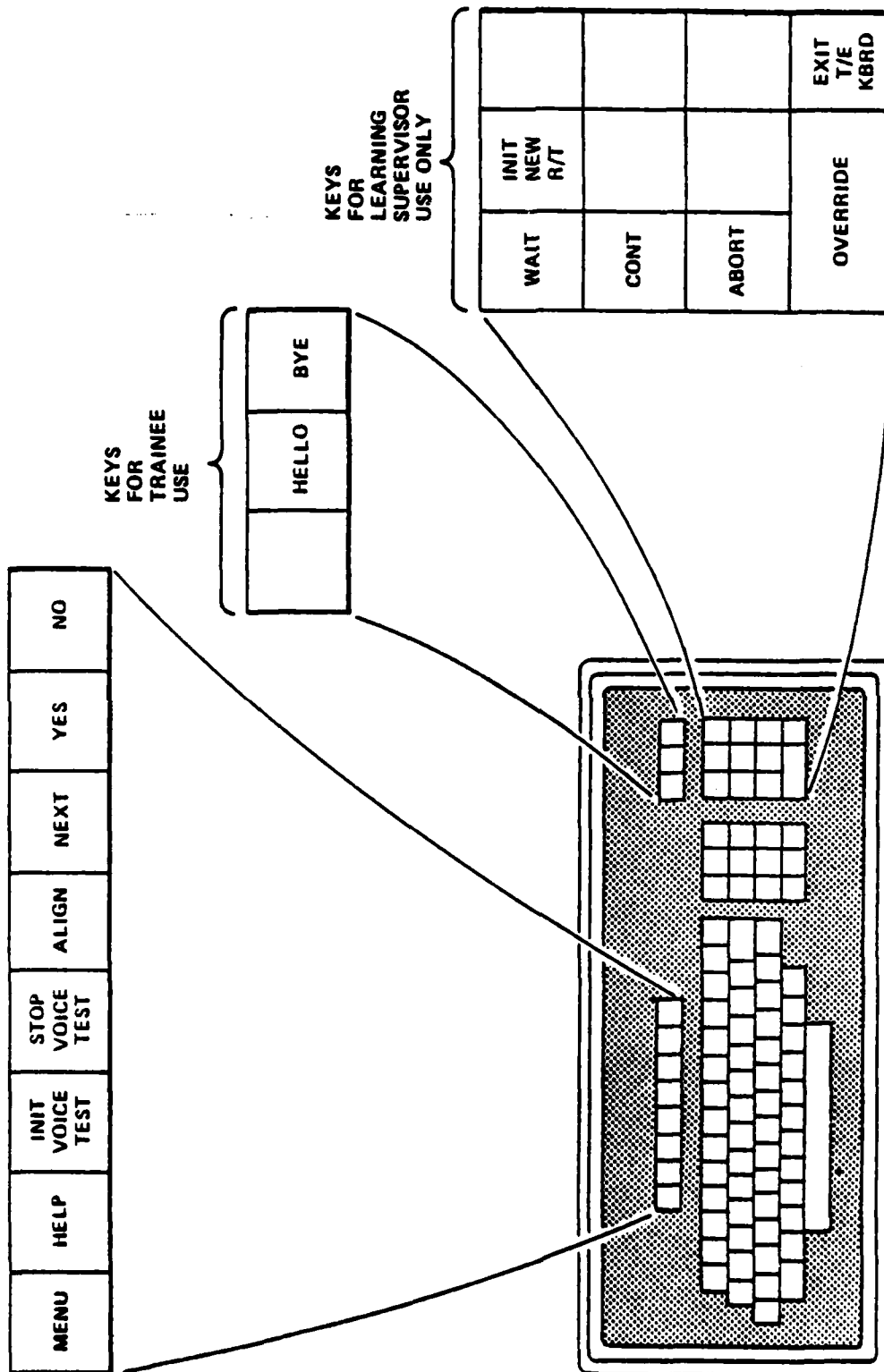
Figure 22. Trainee Keyboard Layout

44

Key: NEW T/E

When active: When no trainee is signed on.

Purpose: To introduce a new trainee to the GCA-CTS. This function must be performed before the trainee signs on to the system for the first time. The information you enter is used to create and maintain the trainee's permanent files.

Notes: Before using this key, it is a good idea to perform the following steps:

1) Select a disk for the trainee's use, make note of the number on it, and place a label on the disk with the trainee's name on it. IMPORTANT: Do not attempt to use the same disk for more than one student.

2) Mount this disk, and start the GCA-CTS program.

3) Be sure to have the trainee's last name, first name or nickname, initials, and serial number or other identification.

The name you enter as the student's last name will be used by GCA-CTS for all the trainee's files. The student must use it to sign on, and many special system requests will require that you enter it.

The name you enter as the student's first name will be used to greet the student when he or she signs on. A nickname may be used.

User dialog:

Please enter the student's last name: <u>lastname [CR]</u>

Enter the student's first name: <u>firstname [CR]</u>

Enter the student's initials
(Please enter exactly three characters): abc [CR]

Enter the student's serial number or other
identification: <u>enter up to 48 characters [CR]</u>

Enter the identification number of this student's disk
(e.g. D202): <u>enter the disk number [CR]</u>

Please verify the following information:
    Student: (firstname lastname)
    Serial number: (as entered above)
    Files will be created on disk: (as entered above)
    In subdirectory: DP2: (student's initials)
Is this information correct? (YES or NO): <u>depress YES or NO</u>

Student file creation will take about two minutes

Would you like to set up files for another
student on this disk? (YES or NO): <u>depress YES or NO</u>

DP2 has been released
New trainee processing complete

Error conditions:

- If two students have the same last name the system tells you:

  Index file already exists.
  To create files for this student
  Use Lastname$Initial instead of Lastname

  Note: When this trainee signs on, he or she will have to enter the
  last name as it appears here.

- If your have tried to put records for too many students on this
  disk:

  Insufficient disk space to create student files

Key: INIT VOICE TEST

When active: After sign on.

Purpose: To start voice testing as soon as the current problem is complete.
The system tries to recognize whatever phrase is spoken.

User dialog:

  Say any phrase that you have learned.
  Watch me recognize your voice!

Error conditions: None

Key: STOP VOICE TEST

When active: When voice testing is in progress.

Purpose: To terminate the voice testing phase.

Notes: If the trainee is quiet for too long during voice testing, the system asks what is going on and says "Hit any key to continue." If STOP VOICE TEST is depressed to satisfy that prompt, it will be interpreted as a request to continue. In this case, hit any key, then depress STOP VOICE TEST.

User dialog: None

Error conditions: None

Key: STATS

When active: After sign on.

Purpose: To provide a summary of the trainee's performance on the learning supervisor's CRT as shown in Figure 23.

User dialog: None

Error conditions: If the trainee has not yet completed a phase 3 task, no summary information can be given. The system reports:

Sorry, the trainee is not far enough along for a summary.

```
•NAME: HICKLIN              MARY            DATE: 8-16-1979   TIME:1819

PRESENTLY WORKING ON PROBLEM:  2 OF TASK:T08$05.03


SUMMARY FOR TASK: T08$04.03
                        PERFORMANCE ANALYSIS:
STRENGTHS                  BORDERLINE              WEAKNESSES

AZIMUTH POSITION/TREND    HEADING ADVISORIES       CLEARANCE REQUESTS
RANGE CALLS

STUDENT WAS ADVANCED TO PRESENT LEVEL AFTER COMPLETING  3 RUNS
NO REMEDIATION NEEDED

TOTAL SYSTEM TIME TO DATE:      0 HOURS AND      0 MINUTES
```

Figure 23. Performance Summary Report

Key: PRINT STATS

When active: Always

Purpose: To provide hardcopy performance reports. The "Strengths and Weak-
          nesses" report is the same as that provided on the CRT by the STATS
          key (shown in Figure 23). The "Task Summary" report is shown in
          Figure 24, the "Problem Summary" in Figure 25, and the "Expanded
          Task Summary" in Figure 26.

Notes: Notice the progression in these three types of printouts in terms of
          the level of detail presented. The first gives you a general impres-
          sion of the trainee's performance. The second gives you the scores
          which were achieved for each problem in the task. (Compare these
          scores to the nominal scores given in Table 4.) The third printout
          shows you exactly why points were lost on a particular problem. The
          last printout, intended primarily for research purposes, gives a task
          summary with additional problem-related information.

          The system provides a list of phase 3 tasks completed at your request
          as shown in Figure 27. This list will enable you to request
          printouts.

          The option is given to request a printout either by task name or by
          the number given in the list. If task name is entered, the system
          searches the trainee's files for the first occurrence of that task
          name, and prints its report. If the same task was repeated as a reme-
          dial problem, override selection, etc., the only way to retrieve
          information about the subsequent attempts is by specifying the task
          number.

          Be sure to turn on the printer when you request a printout.

User dialog:

          Please enter the number for the type of output you would like:
               1: Strengths and weaknesses
               2: Task summary
               3: Problem summary
               4: Expanded task summary
          Enter your selection: enter 1, 2, 3 or 4 [CR]

          If no student is signed on:
               Please enter student's last name.
               enter lastname [CR]

          If a student is signed on, the system asks:
               Are you interested in the files of lastname?
               (Depress YES or NO): depress YES or NO

               Would you like a list of the tasks?
               (Depress YES or NO): depress YES or NO

NAME: HIGGINS MARY PERFORMANCE ON TASK: 1D0904.03

DATE: 0 16 1979 TIME: 1759

KURN NO.	RUD	DIF	AGP	HA	AFT	OFT	RCa	DH	CL	OLT	DR	MG	MC	IM	IAA	IE	IE
1				80	100	100		90									
2				100	100	100		70									
3				80	100	100		0									

Explanations of abbreviations:
RD Handoff; RdA Radio check; TI=turn to final; AGP=Approaching slideraths; HA=Heading
AFb lateral; AFT Azimuth position and trend; OFT Gliderath position and trend; RC) Range call;
DH Decision height; CL=Clearance; OL=Over landing threshold; HR=Handoff and rollout;
MG No Turn; HC Handing corrections; IM Emergency waveoff; IAA=low altitude start; IE transmission break; IE transmission late

Figure 24. Task Summary Report

49

PERFORMANCE ON PROBLEM 3 OF TASK: TDB304.03

TIME: 17:59

NAME: HICKLIN   MARY

DATE: 8 16 1979

SUBJECT AREA   SCORE ERRORS

HEADING ADVISORIES   80 Heading given in a "heading..." advisory not the same as previous heading c

AZIMUTH POSITION AND TREND 100 NONE

RANGE CALLS   100 NONE

CLEARANCE   0 Clearance was not requested

Figure 25.   Problem Summary Report

NAME: JONES ①

DATE: 2-8-1980 ⑤

PERFORMANCE DATA ⑥

TIME: 1400

MIN 5 MAX 10 ④

⑦ RUNS	INtx	RCb	TTF	AGp	HA	APT	GPT	RCa	DH	Cl	OLT	HR	NG	IC	EW	LAA	TB	TR
⑧ 7	⑬ 130	⑭ 2	⑮ 0840	⑯	⑰					⑱ 180	⑲ 10	⑳ 5	㉑ 3	㉒ H	㉓			
	⑬	⑭ SI	⑮	⑯ FS	⑰ C2			ADAPTED — ⑫										
㉔ N/	46	84																

Explanations of abbreviations:
HO=Handoff. RCb=Radio check. TTF=Turn-to-final. AGp=Approaching glidepath. HA=Heading transmissions. APT=Azimuth position and trend. GPT=Glidepath positon and trend. RCa=Range calls. DH=Decision height. Cl=Clearance. OLT=Over-landing-threshold. HR=Handoff or rollout. NU=No gyro. HC=Heading corrections. LAA=Low altitude alert. TB=Transmission break. EW=Emergency waveoff. TR=Transmission rate.

① Student's first name.

② Student's first name.

③ Task file name.

④ Minimum and maximum number of problems needed to complete this task.

⑤ The date this problem was created.

⑥ The time this problem was created.

⑦ The skill category associated with scores in that column (see ㉔).

⑧ The run number. This run number corresponds to the number quoted in "PROBLEM RANGE" of the Plans 3 and 4 "Task Listing." (Figure 25).

⑨ The date that this run was scored.

⑩ The time that this run was scored.

⑪ Pattern controller information:
"R" if the pattern controller released the frequency;
"NR" if the pattern controller did not release the frequency.

⑫ Environmental factors adapted due to poor performance on previous runs. If adaptation occurred, the words "Aircraft," "Pilot," and/or "Wind" will be printed depending on the variables adapted.

⑬ Aircraft type.

⑭ Pilot type:
Numbers range from 1 to 5. 1 is the best pilot, 5 is the worst.

⑮ Starting aircraft position:
"SA" for short approach,
"RB" for right base,
"SI" for straight in,
"LB" for left base.

⑯ Approach type:
"FS" for full stop,
"LA" for low approach,
"TG" for touch-and-go,
"E" for emergency,
"NG" for no gyro.

⑰ Clearance type:
"N/A" for not applicable,
"C3" for clearance given at first request,
"C2" for continue, then clear at 2 miles,
"N" for clearance not given,
"WO" for waveoff,
"CX" for clearance given, then cancelled.

⑱ Mean wind direction.

⑲ Mean wind speed in knots.

⑳ Mean gust speed in knots.

㉑ Mean angust speed in knots.

㉒ Wheels down information:
"P" for given by pilot, not given by controller,
"PC" for given by pilot, given by controller,
"p" for not given by pilot, given by controller,
"NW" for not given by pilot, not given by controller.

㉓ Gyro failure during final approach:
"GF" if gyro fails, else blank.

㉔ The scores given for each skill category scored.

Figure 26. Expanded Task Summary Report

TASK	TYPE	RESULTS	TASK NUMBER	PROBLEM RANGE
T08S04.03	NORMAL	NOT PASSED	7	1 - 3
T08S05.03	NORMAL	NOT YET DONE	8	4 -

THE STATUS OF DECKPLEN   MARY   AS OF 8-15-1979

Figure 27. Phase 3 and 4 Task Listing

Please enter the type of selection you wish to make
    1: Task number
    2: Task name
Enter 1 or 2: <u>entry [CR]</u>

If 1 was entered, it is assumed that a list of tasks is available

    Please enter the 'TASK NUMBER' for the task you want:
    <u>enter a number from the task list [CR]</u>

If a 2 was entered:

    Enter task name: <u>task name [CR]</u>

If a problem summary was requested, and
the task name was entered,

    TASK   PROBLEM RANGE
    taskname   X - Y
    Is this the task you want? (Depress YES or NO): <u>depress YES or NO</u>

Again, if a problem summary was requested,

    Enter number from the 'PROBLEM RANGE' column
    for the run you want: <u>enter problem [CR]</u>

    The output is being sent to the printer

    Would you like another printout?
    (Depress YES or NO): <u>depress YES or NO</u>

Error conditions:

- If no trainee by the name of lastname has been introduced to the system,

    No files were found for lastname
    Do you want to re-enter the name?
    (Depress YES or NO): <u>depress YES or NO</u>

- If the wrong disk is mounted,

    I'm sorry, the student files you requested are not available.
    That student's disk is disknumber.

- If the request is for a student
  other than the student who is signed on,

    Sorry, I can't get the files of a student if another student is
    on.

- Other errors,

    Sorry, no tasks were found with the name taskname
    Do you want to try again? (Depress YES or NO): <u>depress YES or</u>
    <u>NO</u>

    Illegal task name

Key: ↑STOP (this means depress the SHIFT key and the key marked ↑STOP at the same time)

When active: Always

Purpose: To terminate the GCA-CTS program.

Notes: If a trainee is presently signed on, this request will take effect as soon as the training system reaches a convenient stopping point.

User dialog: If a trainee is signed on, the system reports:

GCA-CTS TERMINATE REQUEST
A student is using the system.
Your stop request will be processed
at the end of this problem.

Error conditions: None

Key: WAIT

When active: During phase 2 or 3 problems.

Purpose: To freeze the problem.

User dialog: None

Error conditions: None

Key: CONT

When active: After a freeze or abort.

Purpose: To inform GCA-CTS to continue the approach after a freeze or to restart an ABORTed problem.

User dialog: None

Error conditions: None

Key: ABORT

When active: Demonstration mode, phase 2 and phase 3.

Purpose: To terminate the present approach and restart it without scoring the present attempt.

Notes: Many special requests cannot be processed until an approach is complete. If you enter a special request and find the system responds "Request will be processed at the end of this problem," you may wish to ABORT the problem rather than wait for it to be completed. It will be restarted automatically when the special request processing is complete.

User dialog: After an abort, the system types a menu. If a special request is outstanding, it will initiate that processing. Otherwise it waits for a special request or CONT and prompts:

Enter special request or 'CONT'

Error conditions: None

when active: After sign on.

Purpose: To select a problem in place of the GCA-CTS selection.

Notes: This option can be used to modify the course of training provided by the GCA-CTS. However, because of the sequential nature of the syllabus and the voice data collection requirements, it is not possible to skip ahead in the syllabus. It is possible to advance the trainee to the next sequential task or to choose a task at a level, problem and phase below the present task. The GCA-CTS syllabus is given in Table 7 for your reference.

TABLE 7 . GCA-CTS SYLLABUS

GCA TRAINING SYLLABUS

LEVEL 1

INTRO
T01#00.01
SPEECH INTRO
T01#10.01
PAR INTRO
T01#20.01
MODEL INTRO
T01#30.01

LEVEL 2

INTRO
T02#00.01
AZIMUTH PAR ALIGNMENT
T02#11.01
T02#12.01
HANDOFF ACCEPTANCE
T02#21.01
T02#22.01
T02#22.02
T02#22.03
TURN TO FINAL
T02#31.01
T02#32.01
T02#32.02
T02#32.03
CORRECTIONS ON FINAL
T02#41.01
T02#42.01
T02#42.02
T02#42.03
AZIMUTH CORRECTIONS WITH WIND
T02#51.01
T02#52.01
T02#52.02
T02#52.03

LEVEL 3

INTRO
T03#00.01
COURSE POSITION/TREND
T03#11.01
T03#12.01
T03#12.02
T03#12.03

RANGE
T03#21.01
T03#22.01
T03#22.02
T03#22.03
CLEARANCE
T03#31.01
T03#32.01
T03#32.02
T03#32.03

MISSED APPROACH PROCEDURE
T03#41.01
T03#42.01
T03#42.02
T03#42.03
T03#43.03

LEVEL 4

INTRO
T04#00.01
ELEVATION PAR ALIGNMENT
T04#11.01
T04#12.01
GLIDEPATH APPROACH
T04#21.01
T04#22.01
T04#22.02
T04#22.03
GLIDEPATH ADVISORIES
T04#31.01
T04#32.01
T04#32.02
T04#32.03
DECISION HEIGHT
T04#41.01
T04#42.01
T04#42.02
T04#42.03
T04#43.03

LEVEL 5

INTRO
T05#00.01
FIVE SECOND RULE
T05#10.01
LANDING SEQUENCE
T05#21.01
T05#22.01
T05#22.02
T05#22.03

LEVEL 6

PERFORMANCE RUN INTRO
T06#00.01
PRACTICE
T06#00.03
T06#00.03
T06#00.03
T06#00.03
T06#00.03
PERFORMANCE RUN
T06#10.01
THIS IS IT'
T06#00.04

LEVEL 7

ENRICHMENT INTRO
T07#00.01
LOW ALTITUDE ALERT
T07#11.01
T07#12.01
T07#12.02
T07#12.03
MAINTAINING RADAR CONTACT
T07#21.01
T07#22.01
T07#22.03
NO-GYRO APPROACHES
T07#31.01
T07#32.01
T07#32.02
T07#32.03
EXTRA PRACTICE
T07#40.01
T07#40.03

END OF GCA SYLLABUS

User dialog:

    If a regular syllabus task is in progress:

        Please enter one of the following override options:
           1: Cancel this request
           2: Start an override task at once
           3: Start an override task after completion of the present task
           4: Advance student to the next syllabus task
           5: Cancel the previous override request
        Enter option (1,2,3,4 or 5): __entry [CR]__

    If option 2 or 3 is entered:

        Enter the name of the override task: __taskname [CR]__

    If an override task is in progress:

        An override task is in progress. You have two options:
           1: Cancel this request
           2: Cancel the present override task and resume
              normal progress through the syllabus
        Enter option (1 or 2): __entry [CR]__

        Override processing is complete

Error conditions:

    ●   If the student is just starting the syllabus:

        An override request cannot be made until the student finishes one task.

    ●   If you request a syllabus task for which the trainee is not yet ready:

        It is not possible to skip a task.
        The task must be at level __, task __, phase __ or below
        Would you like to try again? (Depres YES or NO): __depress YES or NO__

    ●   If there is no task with the given name,

        Task taskname does not exist
        Would you like to try again? (Depress YES or NO): __depress YES or NO__

    ●   Other errors,

        Illegal entry

        Illegal phase

Key: INIT NEW R/T

When active: After sign on.

Purpose: To replace or update voice reference patterns.

Notes: This key should only be used if a voice test reveals that the system
is having difficulty recognizing a particular phrase. The system al-
ways keeps the last ten (or four) repeats of each phrase collected
during voice data collection. A voice reference pattern is created by
"averaging" the ten repeats of the phrase (or four repeats in some
cases) to form a composite reference pattern. The number of repeats
you specify here causes that number of patterns to be collected and a
new voice reference pattern to be made. For example, if you specify
three repeats, a new reference pattern will be formed using seven
repeats collected previously plus the three collected at your
request.

It is important to encourage the trainee to follow the guidelines for
good speech recognition when "training" the system to recognize his or
her voice. It is also important for the trainee to say the phrase as
he would in a control situation. A person tends to say things dif-
ferently when he is reading and when he is making a radio transmis-
sion. Encourage the trainee to visualize the control situation, then
speak the phrase.

You might ask the trainee to repeat the phrase a few times before you
collect the new pattern. If he or she inserts pauses in the wrong
places, recognition will fail.

Finally, encourage the trainee to say the phrase in slightly different
but natural ways. No one says things exactly the same way every time.
Speech recognition will work best when the system has samples of the
different ways in which the trainee is likely to say the phrase.

A list of GCA-CTS phrases is given in Table 8.

Note that this key is also available to the trainee, however he or she
can use it to replace only a maximum of half the total samples. When
the instructor functions are active on the trainee keyboard, all the
samples can be recollected if you wish.

User dialog:

Please enter the phrase number (or -1 to terminate): entry [CR]

Enter the number of repeats: entry [CR]

Error conditions:

Illegal entry. Would you like to try again? (Depress YES or NO):
depress YES or NO

Input too large. You can train (maximum #) repeats.

TABLE 8.   GCA-CTS PHRASE LIST

PATTERN CONTROLLER DIALOG

MAXIMUM REPEATS	PHRASE NUMBER	PHRASE
4	75	POSITION FOUR ROGER
4	76	RADAR BUTTON ONE
4	77	RADAR BUTTON TWO
4	83	GIVE ME BUTTON ONE
4	84	GIVE ME BUTTON TWO
4	33	ON THE GO
10	26	MISSED APPROACH
4	1	1 MILE
4	2	1 AND 1/2 MILES
4	3	2 MILES
4	4	2 AND 1/2 MILES
4	5	3 MILES
4	6	3 AND 1/2 MILES
4	30	BUTTON ONE
4	32	BUTTON TWO
4	24	BUTTON ONE CLEAR
4	25	BUTTON TWO CLEAR

CALL SIGNS

MAXIMUM REPEATS	PHRASE NUMBER	PHRASE
4	85	ARMY EIGHT SEVEN SIX
4	86	MARINE SIX EIGHT SEVEN
4	87	NAVY THREE ONE ZERO
4	88	AIR FORCE THREE ZERO SEVEN
10	89	OVER

RADIO/WHEEL CHECK; APPROACHING GLIDEPATH SEQUENCE

MAXIMUM REPEATS	PHRASE NUMBER	PHRASE
4	78	THIS IS YOUR FINAL CONTROLLER HOW DO YOU HEAR ME?
4	97	HOW DO YOU HEAR ME NOW?
4	79	WHEELS SHOULD BE DOWN
10	81	APPROACHING GLIDEPATH
4	80	DO NOT ACKNOWLEDGE FURTHER TRANSMISSIONS
4	82	BEGIN DESCENT
10	89	OVER

TABLE 8.   GCA-CTS PHRASE LIST (CONT.)

RANGE CALLS

MAXIMUM REPEATS	PHRASE NUMBER	PHRASE
4	48	1 MILE FROM TOUCHDOWN
4	49	2 MILES FROM TOUCHDOWN
4	50	3 MILES FROM TOUCHDOWN
4	51	4 MILES FROM TOUCHDOWN
4	92	5 MILES FROM TOUCHDOWN
4	93	6 MILES FROM TOUCHDOWN
4	94	7 MILES FROM TOUCHDOWN
4	95	8 MILES FROM TOUCHDOWN

COURSE AND HEADING MESSAGES

MAXIMUM REPEATS	PHRASE NUMBER	PHRASE
10	62	ON COURSE
10	64	SLIGHTLY RIGHT OF COURSE
10	63	SLIGHTLY LEFT OF COURSE
10	55	RIGHT OF COURSE
10	53	LEFT OF COURSE
10	54	WELL RIGHT OF COURSE
10	52	WELL LEFT OF COURSE
10	65	CORRECTING
4	37	ON CENTERLINE
4	41	SLIGHTLY RIGHT OF CENTERLINE
4	39	SLIGHTLY LEFT OF CENTERLINE
4	40	RIGHT OF CENTERLINE
4	38	LEFT OF CENTERLINE
10	105	TURN RIGHT HEADING
10	107	TURN LEFT HEADING
10	106	HEADING
10	13	0
10	14	1
10	15	2
10	16	3
10	17	4
10	18	5
10	19	6
10	20	7
10	21	8
10	22	9

TABLE 8. GCA-CTS PHRASE LIST (CONT.)

GLIDEPATH MESSAGES

MAXIMUM REPEATS	PHRASE NUMBER	PHRASE
10	66	ON GLIDEPATH
10	70	SLIGHTLY ABOVE GLIDEPATH
10	68	SLIGHTLY BELOW GLIDEPATH
10	69	ABOVE GLIDEPATH
10	67	BELOW GLIDEPATH
10	57	WELL ABOVE GLIDEPATH
10	56	WELL BELOW GLIDEPATH
10	72	COMING UP
10	74	COMING DOWN
10	73	GOING ABOVE GLIDEPATH
10	71	GOING BELOW GLIDEPATH
10	59	GOING FURTHER ABOVE GLIDEPATH
10	58	GOING FURTHER BELOW GLIDEPATH
4	61	AT DECISION HEIGHT

CLEARANCE

MAXIMUM REPEATS	PHRASE NUMBER	PHRASE
10	44	WIND
4	7	AT
10	13	0
10	14	1
10	15	2
10	16	3
10	17	4
10	18	5
10	19	6
10	20	7
10	21	8
10	22	9
4	45	CLEARED FOR LOW APPROACH
4	46	CLEARED FOR TOUCH AND GO
4	47	CLEARED TO LAND
4	8	TOWER CLEARANCE CANCELLED
4	9	TOWER CLEARANCE NOT RECEIVED

TABLE 8. GCA-CTS PHRASE LIST (CONT.)

APPROACH TERMINATION

MAXIMUM REPEATS	PHRASE NUMBER	PHRASE
4	61	AT DECISION HEIGHT
4	34	OVER LANDING THRESHOLD
4	37	ON CENTERLINE
4	41	SLIGHTLY RIGHT OF CENTERLINE
4	39	SLIGHTLY LEFT OF CENTERLINE
4	40	RIGHT OF CENTERLINE
4	38	LEFT OF CENTERLINE
4	23	CONTACT TOWER AFTER LANDING

NO-GYRO PHRASEOLOGY

MAXIMUM REPEATS	PHRASE NUMBER	PHRASE
4	90	THIS WILL BE A NO-GYRO PAR APPROACH
4	91	MAKE HALF STANDARD RATE TURNS
10	99	TURN RIGHT
10	100	STOP TURN
10	101	TURN LEFT

UNUSUAL SITUATIONS AND WAVEOFFS

MAXIMUM REPEATS	PHRASE NUMBER	PHRASE
10	98	CORRECTION
4	8	TOWER CLEARANCE CANCELLED
4	9	TOWER CLEARANCE NOT RECEIVED
4	42	TOO LOW FOR SAFE APPROACH
4	43	TOO HIGH FOR SAFE APPROACH
4	35	TOO FAR LEFT FOR SAFE APPROACH
4	36	TOO FAR RIGHT FOR SAFE APPROACH
4	27	IF RUNWAY NOT IN SIGHT
4	28	IF RUNWAY NOT IN SIGHT EXECUTE MISSED APPROACH
10	102	EXECUTE MISSED APPROACH
4	60	CLIMB AND MAINTAIN ONE THOUSAND FIVE HUNDRED
10	105	TURN RIGHT HEADING
10	103	RADAR CONTACT LOST
4	104	CLIMB AND MAINTAIN THREE THOUSAND
10	99	TURN RIGHT
4	31	PROCEED DIRECT POINT BRAVO HOLD UNTIL ADVISED BY GCA
4	96	LOW ALTITUDE ALERT CHECK YOUR ALTITUDE IMMEDIATELY

TABLE 8.   GCA-CTS PHRASE LIST (CONT.)

OTHER PHRASEOLOGY

MAXIMUM REPEATS	PHRASE NUMBER	PHRASE
10	89	OVER
10	98	CORRECTION

When active: Always

Purpose: To cause a replay of a trainee's P-Run.

Notes: If the error reporting option is chosen, there must be someone at the trainee station to "depress NEXT to continue" after errors.

User dialog:

If a trainee is signed on:

Are you interested in the files of lastname?
(Depress YES or NO): depress YES or NO

If no trainee is signed on:

Please enter student's last name.
Lastname [CR]

Would you like to observe the replay at the trainee station?
(Depress YES or NO): depress YES or NO

If the above answer is YES

The system will pause until you depress NEXT at the trainee station.

Would you like errors reported (Depress YES or NO): depress YES or NO

Would you like to see it again? (Depress YES or NO): depress YES or NO

Would you like to MODify the P-Run file (Depress YES or NO): depress YES or NO

Error conditions:

● If no trainee by the name of lastname has been introduced to the system,

No files were found for lastname
Do you want to re-enter the name?
(Depress YES or NO): depress YES or NO

● If the wrong disk is mounted,

I'm sorry, the student files you requested are not available
That student's disk is disknumber.

64

● If the request is for a student other than the student who is signed on,

Sorry, I can't get the files of a student if another student is on.

● If the P-Run has not been completed:

Sorry, there is no complete P-Run for that student.

Key: MOD

When active: Always

Purpose: To correct any misrecognitions and rescore the P-Run.

Notes: The user dialog requires that the numbers be entered from the "REC" column of the P-Run performance report (Figure 28). The recommended use of this feature is this: Take the P-Run printout (which is auto-matically produced) to the trainee station and observe the replay of the P-Run, noting any misrecognitions on the printout. Then return to the learning supervisor station to modify the P-Run files if neces-sary. When this modification is complete, a new set of scores for the P-Run is computed. These can be printed by making a PRINT STAT request.

The phrase numbers used by the GCA-CTS are given in Table 9.

Don't worry if you make an error — simply modify the phrase again to correct it.

User dialog:

If a trainee is signed on:

Are you interested in the files of lastname?
(Depress YES or NO): depress YES or NO

If no trainee is signed on:

Please enter student's last name.
Lastname [CR]

Would you like a printout of the P-Run?
(Depress YES or NO): depress YES or NO

If yes, the system reports:

One is being sent to the printer.

Please enter the number from the 'REC' column for the phrase you want.
Enter the RECord number of a GCA phrase [CR]

The phrase was understood as:
phrase

Was the callsign correctly reported?
(Depress YES or NO): answer NO only if you wish
to change the callsign or add the callsign to this phrase.

PERFORMANCE RUN SUMMARY REPORT

NAME: HICKLIN

DATE: 8-16-1979   TIME: 1855

REC	SPKR	RANGE	TIME	ADVISORY
8	PTN	9.5	0	Position 4 Hand off Right base
9	PTN	9.5	0	Marine 687 A6 Low approach Button 1
19	GCA	9.5	11	Position 4 roger.
***			11	REFERENCE # 1 Handoff not acknowledged within 10 secs of issuance
21	PTN	9.5	15	Marine 687 After completing Low approach Climb and maintain 1500
22	PTN	9.5	15	Turn right heading 2 7 0
23	PTN	9.5	15	Over
26	PLT	9.5	27	Roger
30	PTN	9.5	28	Marine 687 Turn right heading 150
31	PTN	9.5	28	Over
34	PLT	9.5	35	Roger
45	GCA	8.6	68	Marine 687 Radar button 1.
***			78	REFERENCE # 2 Proper frequency not selected for radio contact

Figure 28. Performance Test Report

PATTERN CONTROLLER DIALOG

MAXIMUM REPEATS	PHRASE NUMBER	PHRASE
4	75	POSITION FOUR ROGER
4	76	RADAR BUTTON ONE
4	77	RADAR BUTTON TWO
4	83	GIVE ME BUTTON ONE
4	84	GIVE ME BUTTON TWO
4	33	ON THE GO
10	26	MISSED APPROACH
4	1	1 MILE
4	2	1 AND 1/2 MILES
4	3	2 MILES
4	4	2 AND 1/2 MILES
4	5	3 MILES
4	6	3 AND 1/2 MILES
4	30	BUTTON ONE
4	32	BUTTON TWO
4	24	BUTTON ONE CLEAR
4	25	BUTTON TWO CLEAR

CALL SIGNS

MAXIMUM REPEATS	PHRASE NUMBER	PHRASE
4	85	ARMY EIGHT SEVEN SIX
4	86	MARINE SIX EIGHT SEVEN
4	87	NAVY THREE ONE ZERO
4	88	AIR FORCE THREE ZERO SEVEN
10	89	OVER

RADIO/WHEEL CHECK; APPROACHING GLIDEPATH SEQUENCE

MAXIMUM REPEATS	PHRASE NUMBER	PHRASE
4	78	THIS IS YOUR FINAL CONTROLLER HOW DO YOU HEAR ME?
4	97	HOW DO YOU HEAR ME NOW?
4	79	WHEELS SHOULD BE DOWN
10	81	APPROACHING GLIDEPATH
4	80	DO NOT ACKNOWLEDGE FURTHER TRANSMISSIONS
4	82	BEGIN DESCENT
10	89	OVER

TABLE 9. GCA-CTS PHRASE NUMBERS (CONT.)

RANGE CALLS

MAXIMUM REPEATS	PHRASE NUMBER	PHRASE
4	48	1 MILE FROM TOUCHDOWN
4	49	2 MILES FROM TOUCHDOWN
4	50	3 MILES FROM TOUCHDOWN
4	51	4 MILES FROM TOUCHDOWN
4	92	5 MILES FROM TOUCHDOWN
4	93	6 MILES FROM TOUCHDOWN
4	94	7 MILES FROM TOUCHDOWN
4	95	8 MILES FROM TOUCHDOWN

COURSE AND HEADING MESSAGES

MAXIMUM REPEATS	PHRASE NUMBER	PHRASE
10	62	ON COURSE
10	64	SLIGHTLY RIGHT OF COURSE
10	63	SLIGHTLY LEFT OF COURSE
10	55	RIGHT OF COURSE
10	53	LEFT OF COURSE
10	54	WELL RIGHT OF COURSE
10	52	WELL LEFT OF COURSE
10	65	CORRECTING
4	37	ON CENTERLINE
4	41	SLIGHTLY RIGHT OF CENTERLINE
4	39	SLIGHTLY LEFT OF CENTERLINE
4	40	RIGHT OF CENTERLINE
4	38	LEFT OF CENTERLINE
10	105	TURN RIGHT HEADING
10	107	TURN LEFT HEADING
10	106	HEADING
10	13	0
10	14	1
10	15	2
10	16	3
10	17	4
10	18	5
10	19	6
10	20	7
10	21	8
10	22	9

GLIDEPATH MESSAGES

MAXIMUM REPEATS	PHRASE NUMBER	PHRASE
10	66	ON GLIDEPATH
10	70	SLIGHTLY ABOVE GLIDEPATH
10	68	SLIGHTLY BELOW GLIDEPATH
10	69	ABOVE GLIDEPATH
10	67	BELOW GLIDEPATH
10	57	WELL ABOVE GLIDEPATH
10	56	WELL BELOW GLIDEPATH
10	72	COMING UP
10	74	COMING DOWN
10	73	GOING ABOVE GLIDEPATH
10	71	GOING BELOW GLIDEPATH
10	59	GOING FURTHER ABOVE GLIDEPATH
10	58	GOING FURTHER BELOW GLIDEPATH
4	61	AT DECISION HEIGHT

CLEARANCE

MAXIMUM REPEATS	PHRASE NUMBER	PHRASE
10	44	WIND
4	7	AT
10	13	0
10	14	1
10	15	2
10	16	3
10	17	4
10	18	5
10	19	6
10	20	7
10	21	8
10	22	9
4	45	CLEARED FOR LOW APPROACH
4	46	CLEARED FOR TOUCH AND GO
4	47	CLEARED TO LAND
4	8	TOWER CLEARANCE CANCELLED
4	9	TOWER CLEARANCE NOT RECEIVED

TABLE 9. GCA-CTS PHRASE NUMBERS (CONT.)

APPROACH TERMINATION

MAXIMUM REPEATS	PHRASE NUMBER	PHRASE
4	61	AT DECISION HEIGHT
4	34	OVER LANDING THRESHOLD
4	37	ON CENTERLINE
4	41	SLIGHTLY RIGHT OF CENTERLINE
4	39	SLIGHTLY LEFT OF CENTERLINE
4	40	RIGHT OF CENTERLINE
4	38	LEFT OF CENTERLINE
4	23	CONTACT TOWER AFTER LANDING

NO-GYRO PHRASEOLOGY

MAXIMUM REPEATS	PHRASE NUMBER	PHRASE
4	90	THIS WILL BE A NO-GYRO PAR APPROACH
4	91	MAKE HALF STANDARD RATE TURNS
10	99	TURN RIGHT
10	100	STOP TURN
10	101	TURN LEFT

UNUSUAL SITUATIONS AND WAVEOFFS

MAXIMUM REPEATS	PHRASE NUMBER	PHRASE
10	98	CORRECTION
4	8	TOWER CLEARANCE CANCELLED
4	9	TOWER CLEARANCE NOT RECEIVED
4	42	TOO LOW FOR SAFE APPROACH
4	43	TOO HIGH FOR SAFE APPROACH
4	35	TOO FAR LEFT FOR SAFE APPROACH
4	36	TOO FAR RIGHT FOR SAFE APPROACH
4	27	IF RUNWAY NOT IN SIGHT
4	28	IF RUNWAY NOT IN SIGHT EXECUTE MISSED APPROACH
10	102	EXECUTE MISSED APPROACH
4	60	CLIMB AND MAINTAIN ONE THOUSAND FIVE HUNDRED
10	105	TURN RIGHT HEADING
10	103	RADAR CONTACT LOST
4	104	CLIMB AND MAINTAIN THREE THOUSAND
10	99	TURN RIGHT
4	31	PROCEED DIRECT POINT BRAVO HOLD UNTIL ADVISED BY GCA
4	96	LOW ALTITUDE ALERT CHECK YOUR ALTITUDE IMMEDIATELY

TABLE 9. GCA-CTS PHRASE NUMBERS (CONT.)

OTHER PHRASEOLOGY

MAXIMUM REPEATS	PHRASE NUMBER	PHRASE
10	89	OVER
10	98	CORRECTION

If NO is entered, the system asks:

    Was any callsign used?
    (Depress YES or NO): <u>depress YES or NO</u>

    Please enter the phrase for the callsign used.
    <u>enter 85, 86, 87, or 88</u>

The system then continues:

    Was the phrase reported correctly?
    (Depress YES or NO): <u>depress YES or NO</u>

If NO is entered, the system asks:

    Please enter the phrase number for the phrase spoken.
    <u>enter phrase number from Table 9</u>

    Was the heading reported correctly?
    (Depress YES or NO): <u>answer NO only if you want to change the heading in a turn, heading or wind message</u>

If NO is entered:

    Please enter the heading.
    <u>enter heading [CR]</u>

If this was a wind message:

    Was the wind speed reported correctly?
    (Depress YES or NO): <u>depress YES or NO</u>

If NO is entered.

        Please enter the wind speed given.
        enter wind speed [CR]

        Was the use of 'correction' correctly reported?
        (Depress YES or NO): depress YES or NO

        The phrase is now:
        phrase
        Is this OK?
        (Depress YES or NO): depress YES or NO

        Do any other phrases need correcting?
        (Depress YES or NO): depress YES or NO

        Do you want a printout of that?
        (Depress YES or NO): depress YES or NO

        Do you want a replay of that?
        (Depress YES or NO): depress YES or NO

Error conditions:

   ● If no trainee by the name of lastname has been introduced to the
     system,

     No files were found for lastname
     Do you want to re-enter the name?
     (Depress YES or NO): depress YES or NO

   ● If the wrong disk is mounted,

     I'm sorry, the student files you requested are not available.
     That student's disk is disknumber.

   ● If the request is for a student other than the student who is signed
     on,

     Sorry, I can't get the files of a student if another student is on.

   ● If the P-Run has not been completed:

     Sorry, there is no complete P-Run for that student.

   ● Other errors

     Illegal entry
     Would you like to try again? (Depress YES or NO): depress YES or
     NO

Key: INIT T/E KBRD

When active: Always

Purpose: To activate the learning supervisor keypad at the trainee station.

Notes: Any keyboard entry at the instructor station will deactivate learning supervisor functions at the trainee station.

User dialog: None

Error conditions: None

Key: EXIT T/E KBRD

When active: After INIT T/E KBRD.

Purpose: To deactivate the learning supervisor functions at the trainee station.

User dialog: None

Error conditions: None

Key: HELP

When active: After sign on.

Purpose: Used by the trainee to post a message at the learning supervisor station that assistance is needed.

User dialog: None

Error conditions: None

Key: ALIGN

When active: After sign on.

Purpose: Used by the trainee to cause the simulated radar to be aligned. Use of this key is scored (skill category 19).

User dialog: None

Error conditions: None

Key: HELLO

When active: Demonstration phase.

Purpose: Used by the trainee to sign on.

User dialog:

What is your LAST name please?
(Type your LAST name,
then depress the key marked CR): <u>lastname [CR]</u>

Hello firstname!

Error conditions:

- If the wrong disk is mounted:

  Your training files are not available.
  Please ask your instructor to install disk number disk.
  Strike HELLO when you are ready to continue.
  BYE

- If the trainee misspells his or her name, or if the instructor has
  not used INIT NEW T/E to establish training files:

  I'm sorry! I could not find your files.
  Do you want to try again? (Depress YES or NO): <u>depress YES or NO</u>

Key: BYE

When active: After sign on.

Purpose: Used by the trainee to inform GCA-CTS that he or she wishes to ter-
         minate the training session.

User dialog: When a convenient stopping place is reached:

Signoff request has been processed.
Goodbye student's name.

Error conditions: None

APPENDIX A

GCA-CTS SKILL CATEGORIES AND SCORING

The following tables describe the GCA-CTS skill categories and show the scoring applied to each element of the skill.

TABLE A-1. SKILL CATEGORY 1, HANDOFF

Controller Action	Partial Credit	Total Possible Points
A. Monitor feeder controller ICS	10	
P. Monitor proper frequency as specified in the handoff	10	
C. Acknowledge handoff		
1) Acknowledgement given prior to radar contact	10	
2) Acknowledgement given within 10 seconds	10	
D. Report radar contact		
1) Radar contact reported prior to radio check	10	
2) 50% of target on display at report	15	
3) Report not later than .10 seconds after 50% target appearance	15	
4) Call sign correct	5	
5) Radio frequency correct	5	
E. ICS off, radio frequency selected		
1) Pattern controller does not relinquish frequency, "Give me..." request made within 15 seconds	5	
2) Pattern controller relinquishes frequency and "Give me..." not used		
3) When pattern relinquishes frequency, ICS is deselected	5	
		100

77

TABLE A-2. SKILL CATEGORY 2, RADIO CHECK

Controller Action	Partial Credit	Total Possible Points
A. Radio Contact		
1) Within 30 seconds of 50% target appearance	10	
2) Proper frequency selected	10	
3) Mike keyed	10	
4) Call sign used	10	
5) One of the following given:	10	
a) "How do you hear..."		
b) "Wheels..."		
c) "Turn...heading"		
d) "Turn..."		
6) Mike unkeyed within 3 seconds and left unkeyed 5 seconds	20	
B. Speech quality		
1) Pilot responds "Loud and clear," or	30	
2) If pilot responds "Weak...,"		
a) Student answers "how...now," unkeys within 3 seconds and leaves unkeyed 5 seconds	15	
b) Pilot can respond "Loud...," i.e., V.U. level normal	15	
		100

Controller Action	Partial Credit Turn	Partial Credit Straight-In	Total Points Possible
A. Accuracy of turn vectors, if given. (Score is given a weight of .6, score for B weighted .4; for a straight-in approach, the entire 100 points is given on B 1 and 2)			
1) Turn in proper direction	40		
2) Call sign correct	20		
B. Quality of turn or initial control			
1) At 6 miles (3 for short approach) target is within 2 target widths of cursor	10	30	
2) At 5 miles (2 short approach) target intercepts azimuth cursor in target zone 1 or 2	20	70	
3) More than 1 turn used to turn aircraft onto final	10		
			100

Controller Action	Partial Credit	Total Possible Points
A. Approaching glidepath		
1) Transmission given	10	
2) Call sign and "over" needed and used	5	
Call sign and "over" not needed and not used		
3) Transmission given when aircraft is within the correct range	5	

Aircraft Speed	Acceptable Range (Miles)
90	0.25-0.75
120	0.33-1.00
140	0.38-1.16
160	0.44-1.33
200	0.55-1.67

4) Transmission given only once during final approach	5	
B. Do not acknowledge		
1) Transmission given only once	10	
2) Correct call sign used	5	
3) The phrase is not followed by "over"	5	
4) Transmitted prior to "begin descent"	5	
C. Begin descent		
1) Transmission given	10	
2) Transmitted within 10-30 seconds after "approaching glidepath"	5	
3) Glidepath cursor intersects upper 1 of target when advisory given	10	
4) Transmitted only once during the approach	5	

TABLE A-4. SKILL CATEGORY 4, APPROACHING GLIDEPATH (CONT)

Controller Action	Partial Credit	Total Possible Points
D. Wheel check		
1) Transmission given prior to "approaching glidepath" when pilot has not said "wheels down"	15	
Transmission not given after pilot has said "wheels down"		
2) Correct call sign and "over" used	5	100

TABLE A-5. SKILL CATEGORY 5, HEADING TRANSMISSIONS

Controller Action	Weighting Factor Applied to Percentage Error	Total Possible Points
A. While range greater than 5 miles; all turns evenly divisible by 5°	.1	
B. Turns must not be of 1°	.1	
C. All heading vectors		
1) Direction of the turn and heading digits correspond such that the direction advised causes the smaller turn	.2	
2) A counter-corrective turn made within 8 seconds when a turn of more than 120° is given	.05	
3) Target enters zone 3 from zone 2, a heading correction given within 20 seconds. This check is initiated when target has been in zones 1 or 2 for 1/2 mile, or at 5 miles (2 for short approach), whichever comes first.	.15	
The heading given in the "Heading..." message the same as previously assigned	.25	
"Heading..." not used more than 5 times in an approach	.15	100

TABLE A-6. SKILL CATEGORY 6, AZIMUTH POSITION AND TREND

Controller Action	Weighting Factor Applied to Percentage Error	Total Possible Points
A. Position calls		
1) Position call correct	.5	
2) "Well" followed by a corrective turn within 3 seconds, or "correcting"	.25	
B. Trend calls		
"Correcting" used only when target is closing with centerline	.25	
		100

TABLE A-7. SKILL CATEGORY 7, GLIDEPATH POSITION AND TREND

Controller Action	Weighting Factor Applied to Percentage Error	Total Possible Points
A. For all glidepath messages, "begin descent" has been given	.10	
B. Position calls		
1) Position correct	.15	
2) A position call made whenever target changes zones, unless superseded by a priority call	.15	
C. Trend Calls		
1) Trend correct	.15	
2) Trend issued if the target moves from one zone to another	.15	
3) Trends not issued successively except in well zone	.15	
4) Trends do not separate identical position messages except in well zone	.15	100

TABLE A-8.   SKILL CATEGORY 8, RANGE CALLS

Controller Action	Weighting Factor Applied to Percentage Error	Total Possible Points
A. All range calls made once the first one is made or 5 miles is reached, whichever comes first, unless superseded	.6	
B. The call made within ±0.1 mile of the mark	.2	
C. Correct range used	.2	
		$\overline{100}$

85

TABLE A-9. SKILL CATEGORY 9, DECISION HEIGHT

Controller Action	Partial Credit	Total Possible Points
A. Decision height call		
1) Call given	25	
2) Target not touching cursors and call was followed by highest priority correct position	25	
B. Range		
1) DH announced within .80 miles from touchdown*	20	
2) DH announced prior to .70 miles from touchdown*	25	
C. Call is made only once during the approach	5	
		100

*Safety error

TABLE A-10. SKILL CATEGORY 10, CLEARANCE

Controller Action	Partial Credit	Total Possible Points
A. Clearance requested		
1) Initial clearance request made after 3.1 miles	10	
2) Initial clearance request made prior to or at 2.9 miles	30	
3) Clearance not received and second request posted between 2.1 and 1.9 miles, or,	10	
Clearance received and not requested again		
B. Issuance of clearance when received from tower		
1) Correct wind information given	10	
2) Wind issued after clearance is received from tower	10	
3) Clearance issued after received from tower*	5	
4) Clearance issued after wind advisory	5	
5) Clearance issued prior to 1 mile	20	
or		
C. Clearance problems leading to a waveoff		
1) If clearance is not received		
a) Reason and waveoff issued prior to 1.3 miles*	35	
b) Proper missed approach transmission used	15	
or		

87

TABLE A-10.   SKILL CATEGORY 10, CLEARANCE   (CONT)

Controller Action	Partial Credit	Total Possible Points
2) If waveoff is given or clearance is cancelled		
a) Reason and waveoff issued within 2 seconds of receipt of cancellation*	35	
b) Proper missed approach transmission used	15	
		100

*Safety error

TABLE A-11. SKILL CATEGORY 11, OVER LANDING THRESHOLD

Controller Action	Partial Credit	Total Possible Points
A. Over landing threshold		
1) Transmission given	20	
2) Given within ±1 second of the target contacting the landing threshold point	20	
B. Final course position		
1) Given within 3 seconds of "over landing threshold"	20	
2) Position correct (including "over" for "on" position)	20	
3) "Over" is used correctly	20	
		100

TABLE A-12. SKILL CATEGORY 12, HANDOFF AND ROLLOUT

Controller Action	Partial Credit	Total Possible Points
A. Rollout instructions on full-stop landing		
1) Rollout instructions given	40	
2) Instructions issued 20-40 seconds after "over"	20	
3) Radio frequency is released within 10 seconds after rollout instructions	20	
4) Pattern controller is notified	20	
or		
B. Handoff to the pattern controller made if aircraft is on low approach or touch-and-go, or executing a missed approach including lost communications		
1) Handoff is given	40	
2) Handoff is made within 30 seconds of:	10	

Condition	Reference Point
Waveoff	Issuance of waveoff
Low approach	Decision height
Touch-and-go	Landing threshold

3) Call sign correct	5	
4) Button correct	5	
5) If missed approach, range must be given to nearest 1/2 mile, else not		
6) Monitor frequency and ICS until pattern transmits "CS radar"	10	
7) Release radio frequency	10	
8) Pattern ICS selected during handoff	10	
		100

TABLE A-13. SKILL CATEGORY 13, NO-GYRO

Controller Action	Partial Credit	Total Possible Points
A. Warn pilot	20	
"Heading XXX" given if 1/4 mile elapses after a turn and less than a 2° change in course is observed		
B. Prepare for no-gyro		
1) No-gyro approach announced	30	
2) No-gyro approach announced if course correction is not taken within 1/2 mile	10	
3) The announcement issued prior to 3/4 mile from the point at which warning was issued	10	
C. Make 1/2 standard rate turns		
1) Transmission given	10	
2) Issued after begin descent, and no-gyro announcement	10	
3) Transmitted only once	10	
		$\overline{100}$

TABLE A-14.   SKILL CATEGORY 14, NO-GYRO HEADING CORRECTIONS

Controller Action	Weighting Factor Applied to Percentage Error	Total Possible Points
A. Turn was in correct direction	.4	
B. "Stop turn" issued	.4	
C. If target enters zone 3 from zone 2, a heading correction given within 20 seconds	.2	100

TABLE A-15. SKILL CATEGORY 15, EMERGENCY WAVEOFFS

Controller Action	Partial Credit	Total Possible Points
A. Radar contact lost		
1) If target moves off the display or the display fails, waveoff issued*	50	
2) Issued within 5 seconds*	25	
3) Proper R/T used for type of approach	25	
or		
B. Target not touching at decision height		
1) Target not touching when decision height message given and waveoff issued*	50	
2) Followed by "Too low" message if aircraft was too low, else by some "too..." message. (Correctness of message scored in PV09, A2)*	25	
3) Proper R/T used for type of approach	25	
		100

*Safety error

END
DATE
FILMED

DTIC

1.0

1.1

1.25

4.5
5.0
5.6
6.3

2.8
3.2
3.6
4.0

1.4

2.5
2.2
2.0
1.8

1.6

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963 A
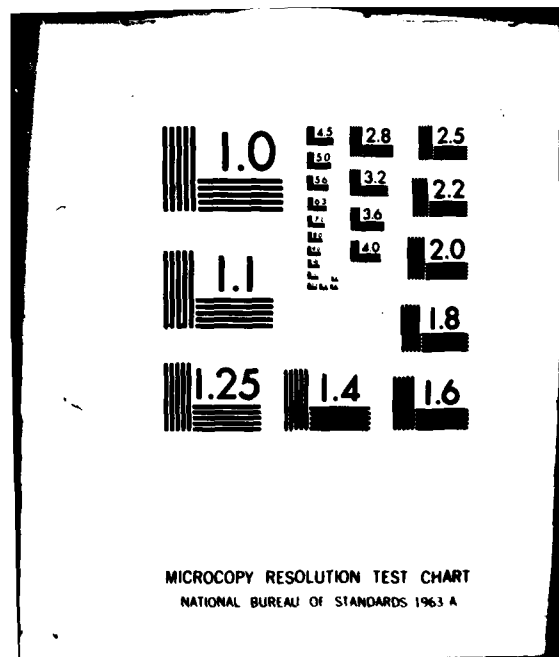
TABLE A-16. SKILL CATEGORY 16, LOW ALTITUDE ALERT

Controller Actions	Partial Credit	Total Possible Points
A. Low altitude alert		
1) Transmitted when target exceeds 1 target width per mile below glidepath	50	
2) Issued within 5 seconds	50	
		100

TABLE A-17. SKILL CATEGORY 17, TRANSMISSION BREAK

Controller Actions	Weighting Factor Applied to Percentage Error	Total Possible Points
A. Mike unkeyed after "over"	.8	
B. At least one break given subsequent to "do not acknowledge" and prior to 1 mile	.2	100

TABLE A-18. SKILL CATEGORY 18, TRANSMISSION RATE

Controller Actions	Total Possible Points
A. Transmission rate after "do not acknowledge" advisory: Not more than 5 seconds between advisories	100

TABLE A-19. SKILL CATEGORY 19, RADAR ALIGNMENT

Controller Action	Partial Credit	Total Possible Points
A. Alignment check preparation		
1) Azimuth: servo down until center-line reflector appears	10	
2) Elevation and range: servo left until touchdown reflector appears	10	
B. Select ALIGN if alignment of		
1) Azimuth	20	
2) Elevation	20	
or		
3) Range	20	
is needed; else not		
C. Reposition antennae		
1) Servo up until 1-mile mark is bisected by glideslope	10	
2) Servo right until the 1-mile mark is bisected by azimuth cursor	10	100

A, B, and C must be performed sequentially or no credit is given

APPENDIX B

CROSS REFERENCE OF P-RUN ERROR REFERENCE NUMBERS TO
THE STUDENT GUIDE DISCUSSION AND COURSE LEVEL

The error reference numbers correspond to the skill category numbers of Appendix A, and scoring criteria can be found by consulting the tables in that appendix.

Error Reference Number	Topic	Student Guide Discussion	Course Level	Problem
1	Accepting the handoff	2.3	2	2
2	Radio check	2.4	2	2
3	Turn to final	2.5	2	3
4	Approaching glidepath, etc.	4.3-4.5	4	2
5	Heading transmissions	2.6,2.7	2	5
6	Course position and trend	3.1,3.2	3	1
7	Glidepath position and trend	4.6	4	3
8	Range transmissions	3.3	3	2
9	Decision height procedure	4.7	4	4
10	Clearance procedure	3.4	3	3
11	Landing threshold	5.2	5	2
12	Handoff and rollout	5.2	5	2
13	Not scored on P-run			
14	Not scored on P-run			
15	Missed approach option at decision height	4.7	4	4
16	Not scored on P-run			
17	Transmission break	5.1		
18	Transmission rate	5.1	5	1
19	Not scored on P-run			

APPENDIX C

RULES FOR GOOD SPEECH RECOGNITION

- Position the microphone so that the flat surface is directly in front of the lips and just far enough away so that the puckered lips almost touch the foam casing.

- Speak naturally as though to a person standing two or three feet away. Don't yell, whisper, or try to add unnatural emphasis.

- Choose a good voice input level by speaking the word "five" and setting the voice meter knob on the trainee communications panel in such a way that the needle moves into the green area.

- Once a good meter level is found, don't change it!

- Use only the phrases in the vocabulary.

- Conform to these stylization requirements:

  1. Pause before and after each digit used in turn headings, "heading...," wind headings, and wind speed.

  2. Always pause before "over".

  3. Always pause before and after "correction".

  4. Always pause before and after the aircraft call sign (but never before or after digits within the call sign).

  5. Do not add pauses within a phrase. Pause only when indicated.

- Use the INIT VOICE TEST key every once in a while to practice. You will find that with just a little practice you can achieve nearly perfect speech recognition.

APPENDIX D

OBTAINING PRINTOUTS OF STUDENT FILES

This appendix describes how to get a printed summary of a student's training activities including sign on times, alignment scores, tasks trained, voice testing times, phrases retrained with NEW R/T, and sign off times. A sample "Student File Reader" report is shown in Figure D-1.

As you can see, the printout shows the student's last name, first name, identification number, and disk number along with the time and date that the printout was created. This is followed by a header which indicates the skill categories for the scores that follow each free practice task which is completed. An explanation of the skill category abbreviations is printed at the end of the printout. The rest of the printout indicates information about each individual training activity. The activities shown are:

1. Sign on, which indicates when the student signed on to the system.

2. Sign off, which indicates when the student signed off of the system.

3. Alignment, which shows the score given for the alignment procedure. No time is given for alignment since it begins immediately after sign on.

4. INIT V/T, which shows the times that the student entered the voice testing mode, and whether the student or the instructor initiated the test.

5. STOP V/T, which gives an indication of how long the student remains in that mode.

6. NEW R/T, which shows the time NEW R/T activity began, the phrases retrained, and whether the student or the instructor initiated the training.

7. The time and date each training task was begun, the final disposition of the task, the number of approaches attempted during that task, the number of timeouts that occurred during that task, and if the task was free practice, the average scores attained for each skill category, or "--" if that skill category was not scored.

User Dialog:

1. At the instructor station, while GCA is not running, and the CLI prompt "R" is on the screen, type:

   DP2F:SFR[CR]

2. Observe the prompt on the CRT and enter the last name of the student you want information about followed by [CR]

   ENTER THE STUDENT'S LAST NAME PLEASE (OR [CR] TO TERMINATE):

3. Respond to the next prompt by answering Y[CR] if this is the correct
   student, or N[CR] if this is the wrong student.

   I HAVE FOUND INFORMATION FOR FIRSTNAME LASTNAME
   IS THIS THE STUDENT YOU WANT? (Y OR N):

4. If you answered yes, you will see the prompt:

   DP2 HAS BEEN RELEASED PLEASE LOAD DISK <disk>
   STRIKE ANY KEY TO CONTINUE

5. The system will pause at this point to allow you to load the correct
   disk. When you have loaded the correct disk, strike any key. You
   will then see the prompt:

   DO YOU WISH TO RESTRICT YOUR ATTENTION TO ACTIVITY
   BEFORE OR AFTER CERTAIN DATES? (Y or N):

6. If you answer N[CR], the printout will show the student's activities
   for every day he has been on the system. If you answered Y[CR], you
   will see the prompt:

   ENTER THE STARTING DATE (YOU WANT RECORDS CREATED AFTER THAT DATE)
   (mm/dd/yy):

7. Enter the date of interest (e.g., 12/4/79 [CR]) and you will be
   prompted:

   ENTER THE ENDING DATE (YOU WANT RECORDS CREATED BEFORE THAT DATE)
   (mm/dd/yy):

8. Enter the date. Output will be sent to the printer.

Error Conditions:

● If the wrong disk is mounted,

   ERROR: STUDENT DIRECTORY DP2:<3 letter identifies> NOT FOUND

● If no student with last name has been introduced to the system,

   FILE DOES NOT EXIST, lastname.IX

● If Directory DP2 could not be released,

   UNABLE TO RELEASE DP2, PROGRAM TERMINATED.

● If Directory DP2F could not be found,

   STOP I_COULDN'T_GET_TO_DP2F???

Figure D-1. Student File Reader Report

APPENDIX E

OVERVIEW OF GCA-CTS OPERATION

This overview shows the required steps involved in using the GCA-CTS.

1. Power up and bootstrap the system.

2. Use the DORT to ensure operational readiness.

3. Start the GCA-CTS program.

4. If a trainee is to use the system who has not previously used it, follow the procedure described for the NEW T/E special function key.

5. Allow the trainee to sign on and begin training.

6. At the end of the day, follow the system shutdown procedures.

APPENDIX F

OPERATING PROCEDURES

This appendix describes the various procedures needed for system operation. The material is divided for convenient reference into the following categories:

- System Startup. The procedures for powering the system up and bootstrapping the operating system are given.

- DORT. The Daily Operational Readiness Test is described.

- GCA-CTS Startup. The GCA-CTS program is started using this procedure.

- Changing Disks. This describes the procedures required to change the removable cartridge.

- System Shutdown. This gives the procedures needed for terminating the GCA-CTS program and powering the system down.

- Recovery. This gives procedures to follow for recovery after a power failure or hardware error.

- Preventive Maintenance. This gives the important steps to follow before and after Data General performs their routine PM.

SYSTEM STARTUP

These procedures must be followed to power up the GCA-CTS hardware and to boot the operating system. Note: Follow these procedures carefully. It is of utmost importance that the proper typed entries are made. Notice that the entries are <u>different</u> for the two stations.

In the following, the symbol [CR] means to strike the carriage return key marked CR.

    a. Turn on the trainee station.

        (1) Turn on the student table (the switch is located underneath the table on the left side where the wires come out).

        (2) Turn on the CRT (the ON/OFF switch pulls out for on).

        (3) Turn on the DISPLAY PROCESSOR (the switch is on the back where the wires come out).

    b. Turn on the learning supervisor station.

        (1) Turn on the instructor table (the switch is underneath the left hand corner, in the back).

        (2) Turn on the CRT (pull out the ON-BRIGHT button).

    c. Turn on the computers.

        (1) Turn on the main power switch for the computers (it is located on the back lower left hand corner, pull it up for on).

        (2) Turn on the diskette drive.

        (3) Turn on the fixed disk drive.

        (4) Turn on the computer marked "Instructor."

        (5) Turn on the computer marked "Trainee."

        (6) Insert the Bootstrap Diskette into drive 0.

        (7) Insert a disk into DP2 and set the LOAD/READY switch to READY.

    d. Boot trainee computer.

        (1) Set DATA switches 0, 11, 12, 14, and 15 (100033_8).

(2) Make sure that diskette drive 0 is at track 0 (if it is not, opening and closing the diskette door will return the drive to track 0).

(3) Toggle STOP down.

(4) Toggle RESET up.

(5) Toggle PROGRAM LOAD up. (You should then see the DATA lights on the CPU flashing.)

(6) Go to the student station. You should see: FILENAME?

(7) Respond by typing: DP2F:SYS2:[CR]. (If the keyboard beeps when you type, pressing the ALPHA LOCK button should stop the beeping and allow you to type.)

(8) The system will respond with:
PARTITION IN USE TYPE C TO CONTINUE

(9) Type: C

(10) The system will respond with: CONTINUE

MAPPED ECLIPSE **S/130** SYSTEM 2 RDOS REV 6.23
DATE (M/D/Y)?

(11) Respond by entering the date (e.g., 6/22/79[CR]).

(12) The system will respond: TIME (H:M:S)?

(13) Respond by entering the time (e.g., 16:30[CR]). (The system uses a 24 hour clock; 4:00 p.m. is 16:00.)

(14) The system should respond with: R

The trainee processor has been bootstrapped.

e. Boot instructor computer.

(1) Set DATA switches 0, 11, 12, 14, and 15 (100033_8).

(2) Make sure that diskette unit 0 is at track 0 (if it is not, opening and closing the diskette door should return the drive to track 0).

(3) Toggle STOP down.

(4) Toggle RESET up.

(5) Toggle PROGRAM LOAD up. (You should then see the DATA lights on the CPU flashing.)

(6) Go to the instructor station. You should see: FILENAME?

(7) Respond by typing: DP2F:SYS1:[CR]. (If the keyboard beeps when you type, pressing the ALPHA LOCK button should stop the beeping and allow you to type.)

(8) The system will respond with:
PARTITION IN USE TYPE C TO CONTINUE

(9) Type: C

(10) The system will respond with: CONTINUE

MAPPED ECLIPSE **S/130** SYSTEM 1 RDOS REV 6.23
DATE (M/D/Y)?

(11) Respond by entering the date (e.g., 6/22/79[CR]).

(12) The system will respond: TIME (H:M:S)?

(13) Respond by entering the time (e.g., 16:30[CR]). (The system uses a 24 hour clock; 4:00pm is 16:00.)

(14) The system should respond with: R

The instructor processor has been bootstrapped.

DAILY OPERATIONAL READINESS TEST (DORT)

DESCRIPTION. DORT was designed to test each GCA-CTS device before the GCA-CTS program is executed. DORT gives the user a demonstration that each device is working properly by producing visible output from the device which can be evaluated by the user or by exercising the devices and displaying the results.

PROGRAM OVERVIEW. DORT consists of two programs, DORT1.SV and DORT2.SV which operate simultaneously in CPU 1 (the instructor station computer) and CPU 2 (the trainee station computer), respectively. Interprogram communication is accomplished via the IPB. DORT1 can test the Votrax, the instructor panel, and initiate a test of the IPB. DORT2 can test the Votrax, the student panel, the voice digitizer, the Megatek display processor, the TTI 500 voice input preprocessor, the high speed correlator, and the IPB.

The Votrax Test. The Votrax test is available from both the student and instructor stations to ensure that the Votrax itself and all of the speakers and headphones are working properly. During the test, DORT will instruct the Votrax to speak twice, once while the user is listening to the speaker in the panel, and once while the user is listening through the headset. The user is then asked to evaluate the Votrax's performance.

The Panel Test. The panel test is available from both the student and instructor station to permit the testing of all panel buttons. DORT activates the panel and manipulates the panel lights so that the user can evaluate panel performance.

The Digitizer Test. DORT tests the digitizer by prompting the user to speak a phrase which is recorded and played back for the user to evaluate.

The Megatek/Servo Test. For this test, DORT draws a picture and activates the joystick monitor so that the user can evaluate the performance of these devices.

TTI 500/HSC Test. The TTI 500 test evaluates the performance by counting the number of times each individual feature is set when the Votrax speaks to the TTI 500 and comparing the counts to "normal" counts that were collected earlier. The high speed correlator (HSC) is tested by correlating random numbers using both a software simulation of the HSC and the HSC itself and comparing the results.

IPB Test. DORT tests the IPB by attempting to establish an active line of communication between CPU 1 and CPU 2. If contact is established, the IPB will be used by CPU 2 to request CPU 1 to perform certain functions that produce visible results at the student station but can only be performed by CPU 1.

Running DORT. To execute the DORT program package you must first ensure that both CPU 1 and CPU 2 are up and running. If the system is shut down, as it would be before training begins each morning, activate the system using the

113

system startup procedure described previously. When both systems have been bootstrapped, use the following procedure to ensure that the system is ready.

    a. Make sure that the trainee computer is ready.

        (1) Check to see that the CLI is active. The system should write an 'R' on the CRT each time you type a [CR].

        (2) Type DIR DP2F[CR]

        (3) Type CLEAR/V/A/D[CR]

        (4) Type SPKILL $DPO[CR]

    b. Make sure that side 1 is active.

        (1) Check to see that the CLI is active.

        (2) Type DIR DP2F[CR]

        (3) Type CLEAR/V/A/D[CR]

    c. The system is now ready to begin DORT.

Execution of DORT. Once you have prepared the system, use the following procedure to execute DORT.

    a. Type: DORT[CR] DORT will respond by writing:

        FILE DORT$ERRORS ALREADY EXISTS, MAY I DELETE IT? (YES OR NO):

    b. Respond by depressing the YES key.

    c. Read and follow the DORT instructions. Eventually you select the IPB option. DORT will respond with:

        GO TO THE STUDENT STATION TO BEGIN SIDE 2 TESTING

    d. At this time, go to the student station and type: DORT2[CR]
       DORT will respond with:

        FILE DORT2$ERRORS ALREADY EXISTS, MAY I DELETE IT? (YES OR NO):

        Unless you have a specific reason to save the old output, answer by depressing: 'YES.'

    e. Read and follow the DORT instructions. Eventually you will complete all of the tests and select the STOP option. DORT will then output a final summary to DORT2$ERRORS and check to see that all of the

tests were passed. If there was a failure, DORT will tell you:

WARNING!!!
DEVICE MALFUNCTION
DO NOT START GCA TRAINING

If there were no failures, DORT will write:

THIS SIDE READY TO START GCA-CTS

f. Note the result and return to the instructor station. At the
    instructor station, you should see the normal options list. You may
    select any test or follow DORT's suggestion and STOP.

g. When you do elect to STOP, DORT will output a final summary of the
    side 1 tests to DORT$ERRORS and write:

WARNING!!!
DEVICE MALFUNCTION
DO NOT START GCA TRAINING

or:

THIS SIDE READY TO START GCA-CTS

depending on whether all of the tests were passed or not.

h. If both sides said they are ready to start training, you may in-
    itiate GCA-CTS, otherwise, proceed to the section on DORT error
    analysis.

DORT ERROR ANALYSIS. DORT produces two error files. DORT$ERRORS and
DORT2ERRORS, which are created by DORT1.SV and DORT2.SV, respectively. If an
error is discovered, DORT will issue a warning at program termination. The
user must then track down and correct any errors. The recommended method of
tracking down errors is as follows. At the instructor station, turn on the
printer and type:

a. PRINT DORT$ERRORS DORT2ERRORS [CR]

b. Examine the last page from each file. This page should be titled
    "TEST RESULTS" (see Figures F1 and F2).

    (1) Examine the WORKING column in the table. Tests that were
         failed will have a zero in that column.

    (2) When you find a test that DORT says was failed, check to make
         sure that that test was attempted by examining the ATTEMPTS
         column. The number in that column represents the number of
         attempts that DORT made to perform that test. If a test has

	VALID**	WORKING*	ATTEMPTS	FAILURES
VOTRAX (computer generated voice)	1	0	2	2
PANEL (student/instructor panels)	1	0	1	1
IPB (establish contact with CPU 2)	1	1	1	0
DIGITIZED VOICE (recording/playback)	0	1	1	0

**A 1 in the valid column means the test should appear in the list of available options, a 0 means that you must complete other tests before attempting this one.

*A 1 means that the device has been tested and functioned properly, a 0 means that the device is not working properly or has not been tested.

Figure F1. Example of DORT Test Results Summary for Instructor Computer Tests

	VALID**	WORKING*	ATTEMPTS	FAILURES
VOTRAX (computer generated voice)	1	1	1	0
VOTRAX (results of side 1 tests)	1	1	1	0
PANEL (student/instructor panels)	1	0	0	0
PANEL (results of side 1 tests)	1	1	1	0
DIGITIZED VOICE (recording/playback)	1	0	0	0
MEGATEK/SERVO (test radar display)	1	0	0	0
VIP/HSC (voice recognition)	1	0	0	0

**A 1 in the valid column means the test should appear in the list of available options, a 0 means that you must complete other tests before attempting this one.

*A 1 means that the device has been tested and functioned properly, a 0 means that the device is not working properly or has not been tested.

Figure F2. Example of DORT Test Results Summary for Trainee Computer Tests

never been attempted (0 in ATTEMPTS column) DORT will indicate that the device is broken. If there are no tests that were attempted and failed, DORT is telling you not to start training because you have not finished testing.

c. If you find that several tests failed, refer to Table F1 and Table F2 and try to find a single device failure that explains all of the test failures.

d. When you find a test that has been both attempted and failed, look back through the error file printout (DORT$ERRORS or DORT2$ERRORS) for the latest output from the failed test. There should be at least one error message. Refer to Table F3 for an appropriate course of action.

e. After you locate and correct all errors, rerun DORT to ensure that a fix has been made.

Table F1. Potential Relation of Device Failure to Test Failure

Failing Device

Observed Test Failures	Votrax	Panel	Digitizer	IPB	TTI 500	HSC	Megatek	Servo	User Error*
Votrax (side 1)	x	x							x
Votrax (side 2)	x	x		x					x
Panel (side 1)		x							x
Panel (side 2)		x		x					x
Digitizer		x	x	x					x
IPB (side 1)				x					x
IPB (side 2)				x					x
TTI 500 (VIP)	x	x		x	x				x
HSC						x			
Megatek							x		x
Servo							x	x	x

EXPLANATION

In DORT, the failure of one device may cause the user to observe several tests failing. The above table illustrates the potential relationship between device and test failures. An 'X' in the table represents the possibility that a device failure may cause the test to fail. It does not mean that if device 'U' fails that test 'T' must fail (see Table F2).

---

* This column is included only to show the importance of responsible user interaction. If you make an error while running a test, reselect that test and make the proper response.

Table F2. Mandatory Relation of Device Failure to Test Failure

Failing Device

Observed Test Failures	Votrax	Panel	Digitizer	IPB	TTI 500	HSC	Megatek	Servo
Votrax (side 1)	x							
Votrax (side 2)	x							
Panel (side 1)								
Panel (side 2)								
Digitizer			x					
IPB (side 1)								
IPB (side 2)								
TTI 500 (VIP)				x				
HSC					x			
Megatek						x		
Servo							x	

EXPLANATION

A failure of device 'D' will always cause a failure of test 'T' if there is an 'X' in row 'T', column 'D' of this table.

Table F3. Dealing with Errors Reported by DORT

1. Votrax errors.

    a. Check to see that Votrax is turned on.
    b. Reboot the system and try again.
    c. Call Logicon.

2. Panel errors.

    a. If the problem is isolated to a few buttons only,
        try replacing the lights in those buttons.
    b. Reboot the system and try again.
    c. Call Logicon.

3. Digitizer errors.

    a. Reboot the system and try again.
    b. Call Logicon.

4. Megatek/Servo errors.

    a. Reboot the system and try again.
    b. Run Megatek diagnostics.
    c. Call Logicon.

5. IPB errors.

    a. Reboot the system and try again.
    b. Run IPB diagnostics.
    c. Call Logicon.

6. TTI 500.

    a. Reboot the system and try again.
    b. Run VIP diagnostics.
    c. Call Logicon.

GCA-CTS STARTUP

The GCA-CTS program itself is started by making entries at both key-boards. The procedure is:

1. Mount the appropriate trainee disk.

2. At the learning supervisor station, type:

   DIR DP2F [CR]
   GCA [CR]

3. At the trainee station, type:

   DIR DP2F [CR]
   CTS [CR]

4. Return to the learning supervisor station. Observe the prompt on the CRT and enter a response:

   How late will you want me to work this evening?
   (Please enter the time I should ask the trainee if he or she wants to go home, then depress the key marked CR. For example, type 1600, then depress CR.)
   Enter time:

5. Respond to the next prompt (a CONT starts the demonstration phase):

   Enter special request on CONT.

CHANGING DISKS

Whenever it is necessary to change the disk cartridge, follow these steps.

1. If the GCA-CTS program is running, terminate it by depressing the SHIFT key and the ↑STOP key at the same time.

2. Wait until the GCA-CTS termination message appears and the CLI types an "R" on the CRT.

3. If GCA-CTS was not running, you must release DP2 before continuing. (GCA-CTS ↑STOP does this for you.)

    a. At the learning supervisor station, type:

       RELEASE DP2[CR]

    b. At the trainee station type:

       RELEASE DP2[CR]

    When the system responds DEVICE NOT IN SYSTEM: DP2, or just gives an "R," proceed to the next step.

4. Go to the system controller cabinet. Toggle the LOAD/READY switch on the disk unit to LOAD.

5. When the LOAD light comes on, unlatch the disk and pull it all the way out. (It's easy to bang the switches on the computer while removing the disk if you aren't careful to pull the unit out.)

6. Remove the cover.

7. Push the slide on the disk handle to the left, pull the handle up to a vertical position, and gently pull the disk straight up.

8. Immediately place the cover under the disk and rotate the handle back to the horizontal position, letting the slide snap back into place.

9. Place the dust cover on the disk unit if no disk is to be mounted.

10. If another disk is to be mounted, push the slide on the handle left and rotate the handle to the vertical position to release the cover.

11. Standing in front of the disk unit, mount the disk so that the slide part of the handle is facing you. Be sure the disk slips down over the four guides in the bottom of the unit. Rotate the handle to the horizontal position and place the disk cover over the disk.

12. Gently slide the unit back into the cabinet (if the cover scrapes, the disk is not mounted properly) and secure the latches.

13. Toggle the LOAD/READY switch to READY and wait for the light to come on. If a minute passes and this light hasn't come on, the disk is not properly mounted. Try again.

WARNING. If anyone types on either CRT when the disk is not READY, a panic will result. At the CRT will be five numbers and the last one will be 100006. You must reboot the processor if this happens, using the system startup procedure.

SYSTEM SHUTDOWN

To shut the system off, follow these steps.

1. If GCA-CTS is running, depress the SHIFT and ↑STOP keys at the same time at the learning supervisor station.

2. When the system types an "R", type:

    RELEASE %MDIR%[CR]

3. The system will respond

    MASTER DEVICE RELEASED

4. If it responds instead

    SPOOL FILES ACTIVE

   Type

    SPKILL $LPT[CR]
    SPKILL $DPO[CR]
    SPKILL $VRO[CR]

   Then repeat Step 2.

5. Power the instructor station down, using the master switch.

6. Go to the trainee station, repeat Step 2.

7. If this system responds

    SPOOL FILES ACTIVE

   Type

    SPKILL $DPO[CR]

8. If these steps fail to cause the system to report MASTER DEVICE RELEASED, continue to Step 9.

9. Power the trainee station down, using the master switch.

10. Go to the system controller, toggle STOP then RESET on each processor.

11. Remove disks, store carefully.

12. Power off:

   ● Diskette

   ● Disk

   ● Instructor computer

   ● Trainee computer

   ● System controller circuit breaker (in the lower left hand corner of the <u>back</u> of the cabinet).

RECOVERY

If the system goes down due to a power failure or hardware failure or for any reason which is not immediately obvious, the following recovery procedures should be performed.

1. If the system detects a hardware error, it will "panic." This means it will type five numbers on the screen, then die. The panic codes are given in Appendix G of the RDOS Manual. <u>ALWAYS COPY THE PANIC CODE</u> and other numbers into the system log. Note the circumstances surrounding the panic, indicate which processor failed, etc. You may wish to try to restart, depending on the nature of the error. If so, use the following steps.

2. If one processor detected a hardware error, the GCA-CTS program may still be running in the other processor. You must stop it by:

   a. At the trainee station:

      ● Depress SHIFT and MENU at the same time. The system will echo "*." (If it echoes "!" instead, depress SHIFT and MENU again. This time you'll get an "*.")

      ● Depress CTRL and A at the same time. The system will echo "INT" then "R."

      ● Depress CTRL and F at the same time. The system will echo "FG TRM."

   b. At the learning supervisor station:

      ● Depress SHIFT and MENU at the same time. The system will echo "CTRL C ENABLED." (If it says "CTRL C DISABLED," depress SHIFT and MENU again.)

      ● Depress CTRL and A at the same time. The system will echo "INT," then "R."

   c. At either station, type: RELEASE %MDIR%[CR]. The system will respond: MASTER DEVICE RELEASED. (Follow system shutdown procedures if it does not.)

3. Check the integrity of the disks.

   a. Boot instructor computer.

      ● Set DATA switches 0, 11, 12, 14 and 15 (100033_8).

      ● Make sure that diskette unit 0 is at track 0 (if it is not, opening and closing the diskette door should return the drive to track 0).

- Toggle RESET up.

- Toggle PROGRAM LOAD up. (You should then see the DATA lights on the CPU flashing.)

b. Run FDCHK.

- Go to the instructor station: You should see: FILENAME?

- Respond by typing: FDCHK[CR]

- The system will, after a few moments, echo:

    FDCHK

- Continue typing the line as shown

    FDCHK/R DP2[CR]

- This utility will type as it checks the disk. If it reports mislinked blocks, depress CTRL A and call Logicon.

- When it has finished checking the disk, it will again prompt

    FDCHK

- Continue typing as shown

    FDCHK DP2F[CR]

    Again, call Logicon if mislinked blocks are detected.

- When the disk checking is complete and the next FDCHK prompt comes up, type CTRL and A. The system will respond

    FILENAME?

4. Bootstrap the operating system. Perform the bootstrap procedure as described in the system startup section.

5. On one CRT make the following entries

    DIR DP2F[CR]
    CLEAR/A/V/D[CR]
    DIR DP2[CR]
    LIST -.DR

6. The system will list the subdirectories on the removable cartridge. For example, it will always list SYS.DR and MAP.DR and also list the trainee subdirectories such as ABC.DR. If a trainee was signed on when the problem occurred, use the subdirectory list to enable you to get to the trainee's subdirectory. If the trainee who was signed on had the initials ABC,

```
DIR ABC[CR]
CLEAR/A/V/D[CR]
DIR DP2F[CR]
RELEASE DP2[CR]
```

7. The system is ready to resume operation. Perform GCA-CTS startup.

PREVENTIVE MAINTENANCE

The equipment is covered by service agreements with the manufacturers. In some cases, this service includes regular preventive maintenance. If the Data General representative decides to run the disk reliability test as part of the PM, or for any reason, it will destroy the contents of the fixed disk. There are some steps you _must_ take before this is done.

1. Stop the GCA-CTS program.

2. Mount the floppy disk labeled "Index file backup" on drive 1.

3. Type:

```
DIR DP2F[CR]
SAVEINDEX[CR]
```

4. Perform system shutdown procedures, but do _not_ power down any equipment.

5. REMOVE ALL DISKS or their contents will be destroyed. Remove the cartridge disk and both floppies.

6. Give the representative a scratch disk and scratch floppies for use in testing.

When diagnostic testing has been completed and the representative informs you that the fixed disk needs to be rebuilt, perform the following steps.

1. Toggle STOP, then RESET on each computer.

2. Check the thumbwheels. Ensure the diskettes are units 0 and 1 and the disk is unit 2.

3. Mount the bootstrap diskette in unit 0.

4. Mount the index file backup diskette in drive 1.

5. Mount D202, the "DP2F COPY DISK."

6. Boot instructor computer

   - Set DATA switches 0, 11, 12, 14, and 15 (100033_8).

   - Make sure that diskette unit 0 is at track 0 (if it is not, opening and closing the diskette door should return the drive to track 0).

   - Toggle STOP down.

   - Toggle RESET up.

   - Toggle PROGRAM LOAD up. (You should then see the DATA lights on the CPU flashing.)

   - Go to the instructor station: You should see: FILENAME?
     Type: COPY[CR]

7. After a few moments, the system will prompt: COPY

8. Continue typing the line as shown

   COPY/R DP2 DP2F[CR]

   Be careful with this command! It will destroy the backup disk if you enter the improper command.

9. After about 2 minutes, when the copy is complete, the system again prompts: COPY

10. Depress CTRL and A, and the system will type FILENAME? Bootstrap both computers as described in the System Startup section.

11. Restore the trainee's index files by typing (at either CRT)

    DIR DP2F[CR]
    RESTOREINDEX[CR]

12. The system is now ready for GCA-CTS to be started.

DISTRIBUTION LIST

Commanding Officer
Naval Training Equipment Center
Orlando, FL 32813   20

Defense Technical Information Center
Cameron Station
Alexandria, VA 22314   12

(All other addressees receive one copy)

Commander
Naval Air Systems Command
Washington, DC 20361

Commander
Naval Air Systems Command
AIR 413F
Washington, DC 20361

Mr. John T. Masterson
US Postal Lab
11711 Parklawn Drive
Rockville, MD 20852

Chief of Naval Operations
OP-987H
Attn: Dr. R. G. Smith
Washington, DC 20350

Mr. Walter Primas
Chief of Naval Operations
OP-39T
Washington, DC 20350

Mr. Ernest E. Poor
Naval Air Systems Command
AIR 413B
Room 336
Washington, DC 20361

Dr. Henry M. Halff
Office of Naval Research
Code 458
Arlington, VA 22217

Dr. Marshall J. Farr
Director, Personnel and Training
  Research Program
Office of Naval Research
Arlington, VA 22217

Commander
Naval Supply Systems Command
Code 034
Washington, DC 20376

Scientific Advisor
Headquarters US Marine Corps
Washington, DC 20390

Dr. James D. Mosko
Naval Aerospace Medical Research Lab
Acoustical Sciences Division
Code L34B
Pensacola, FL 32508

Chief of Naval Technical Training
Code N8
NAS Memphis (75)
Millington, TN 38054

Commanding Officer
Naval Air Technical Training Center
Code 741A, Building S-769
NAS Memphis (85)
Millington, TN 38054

Dr. Sam Schiflett
Naval Air Test Center
SY 721
Patuxent River, MD 20670

T. Weiner
Naval Air Devleopment Center
Code 4043
Warminster, PA 18974

Commander
Naval Air Development Center
Attn: Code 6022
Arminster, PA 18974

Dr. Christian P. Skriver
Naval Air Development Center
Code 6021
Warminster, PA 18974

CDR P. M. Curran
Naval Air Development Center
Technology Development Branch
Code 602
Warminster, PA 18974

DISTRIBUTION LIST (continued)

Navy Personnel Research and Develop-
  ment Center
Attn: M. McDowell
Library: Code P201L
San Diego, CA 92152

John Silva
Naval Ocean Systems Center
Code 823
San Diego, CA 92152

Mr. Richard W. Obermayer
Navy Personnel R&D Center
Code P311
San Diego, CA 92152

Mr. Gary Poock
Naval PG School
Code 55PK
Monterey, CA 93940

Mr. Warren Lewis
Naval Ocean Systems Center
Human Engineering Branch
Code 8231
San Diego, CA 92152

Commander
Training Command
Attn: Educational Advisor
US Pacific Fleet
San Diego, CA 92147

LT Jeff Woodard
RADC/IRAA
Griffiss AFB
Rome, NY 13441

CAPT Vince Mortimer
AFAMRL/BBM
Wright-Patterson AFB
Dayton, OH 45433

Mr. Harold A. Kottmann
ASD/YWE
Wright Patterson AFB, OH 45433

Headquarters 34 Tactical Airlift
  Training Group/TTDI
Little Rock AFB, AK 72076

Headquarters
Air Training Command, XPTI
Attn: Mr. Goldman
Randolph AFB, TX 78148

US Air Force Human Resources Lab
TSZ
Brooks AFB, TX 78235

US Air Force Human Resources Lab
AFHRL-TT (Dr. Rockway)
Technical Training Division
Lowry AFB, CO 80230

Commander
Naval Air Force
US Pacific Fleet (Code 316)
NAS North Island
San Diego, CA 92135

Dr. Tice De Young
US Army Engineer Topographic
  Laboratories Research Institute
Ft. Belvoir, VA 22060

USAHEL/USAAVNC
Attn: DXXHE-FT (Dr. Hofmann)
P. O. Box 476
Ft. Rucker, AL 36362

Chief
ARI Field Unit
P. O. Box 476
Ft. Rucker, AL 36362

Chief
ARI Field Unit
P. O. Box 2066
Attn: Librarian
Ft. Benning, GA 31905

Army Training Support Center
ATTSC-DS
Ft. Eustis, VA 23604

Commandant
US Army Field Artillery School
Counterfire Department
Attn: Eugene C. Rogers
Ft. Sill, OK 73503

DISTRIBUTION LIST (continued)

Director
US Army Research and Technology
  Laboratory
DAVDL-AS (Attn: Dr. R. S. Dunn)
207-S AMES Research Center
Moffett Field, CA 94035

Dr. Henry J. DeHaan
US Army Research Institute
5001 Eisenhower Avenue
Alexandria, VA 22333

Mr. Lockwood Reed
US Army Avionics R&D Activity
DAVAA-E
Ft. Monmouth, NJ 07703

Dr. J. D. Fletcher
Defense Adv. Research Projects Agency
(OTO)
1400 Wilson Boulevard
Arlington, VA 22209

Dr. Jesse Orlansky
Institute for Defense Analyses
Science and Technology Division
400 Army-Navy Drive
Arlington, VA 22202

Federal Aviation Administration
NAFEC Library
Atlantic City, NJ 08405